

# A revision of the European Agathidinae (Hymenoptera: Braconidae)

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## Synopsis

Seven genera of the braconid subfamily Agathidinae are revised for the European zoogeographical region. Keys to the genera and species are provided. Fifty-four species are recognized as valid, 11 are newly synonymized, and 11, including an extralimital species from Jordan, are described as new. Lectotypes are designated for 13 nominal species. Authentic host records are included together with an account of the biology of the subfamily.

## Introduction

Although the braconid subfamily Agathidinae has a world-wide distribution, it is poorly represented in the western Palaearctic region. The present revision deals with the fauna of Europe, including European U.S.S.R., and Turkey; one species from Jordan is included for comparative purposes.

Earlier contributions to the taxonomy of European Agathidinae are those of Nees von Esenbeck (1834), Wesmael (1837), Reinhard (1867), Thomson (1895), Marshall (1885; 1888) and Fahringer (1937). The more recent, notable taxonomic revisions on Palaearctic Agathidinae are those of Telenga (1955) and Tobias (1976*a*), the former concentrating on the European species, the latter on the Central Asian species. Their combined research reveals an agathidine fauna that hardly differs numerically from that covered in the present work. Even Tobias's paper (1976*b*) on the Far Eastern species of *Microdus* includes only four that are not represented in Europe.

The Agathidinae is well represented in the tropics and Shenefelt's catalogue (1970) lists

numerous species; however, most of these will require investigation before their status can be properly assessed. Some attempt to sort out the chaos of names in the Oriental species has been made by Bhat & Gupta (1977), but other than this no major taxonomic research has been done on the tropical fauna. The classified, tropical material in the British Museum (Natural History) has been examined briefly; although quantitatively small and unreliably determined it provides some information on evolutionary trends within the Agathidinae. It seems that the subfamily divides into two main sections, the *Agathis-Microdus* group of genera which have lobed or simple claws and are restricted mainly to the Northern Hemisphere, and the *Cremnops-Disophrys* group of genera which are predominantly tropical in distribution. Shenefelt (1970) includes most of the described species in these two genus groups. *Microdus* is Holarctic but also occurs in the Southern Hemisphere. Two mainly tropical genera, *Cremnops* and *Disophrys*, are each represented by a single species in the western Palearctic region.

Little can be said here about the North American Agathidinae, but *Agathirsia* Westwood exhibits a line of descent different from the two genera just mentioned. Its wing venation is typical of the subfamily but its body-form and especially the exaggerated length of the labium isolate it from the Old World genera.

The aim of the present review is to enable the reader to identify more easily the European species of Agathidinae; to postulate evolutionary trends within the subfamily is beyond its scope.

### Depositories

AA	A. A. Allen collection, Reigate, Surrey.
AS	Zoological Institute, Leningrad.
AZ	A. Zaykov collection, Plovdiv.
BMNH	British Museum (Natural History), London.
EH	Erasmus Haeselbarth collection, Munich.
HNHM	Természettudományi Múzeum, Budapest.
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels.
LC	Linnaean collection, Linnean Society, London.
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin.
MS	Mark Shaw collection, Edinburgh.
NM	Naturhistorisches Museum, Vienna.
RNH	Rijksmuseum van Natuurlijke Historie, Leiden.
UM	University Museum, Oxford.
USNM	National Museum of Natural History, Washington, D.C.
ZH	Zoological Museum, Helsinki.
ZI	Zoologiska Institutionen, Lund.
ZM	Zoologisk Museum, Copenhagen.
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich.

### Taxonomic characters

The agathidine taxa studied in this revision are variable in colour, sculpture and ovipositor length, and *Agathis* and *Microdus* contain groups of what at first sight appear to be valid species but which subsequently prove to be inseparable because of intermediate forms. There are two alternatives: either the variants are regarded as different species, or a wide range of variation is accepted. The latter alternative has been chosen here since the concept of a species-aggregate, even if it offers no more than a provisional solution, at least avoids an increase in the number of dubious taxa. Nevertheless, species of Agathidinae have some characters that are reasonably constant and therefore useful for identification purposes.

The elongation of the head in facial view, though slightly variable, is frequently used in separating species of *Agathis*. It is defined as the length of the malar space measured against the longer diameter of the eye. The surface of the frons is also important, especially in *Agathis* in which it is either smooth, or provided with a deepened cavity or trough margined by raised keels. The conformation of this structure is diagnostic in such species as *breviseta* and *assimilis*.

Indispensable for at least a partial breakdown of species of *Agathis* are the mouth-parts. These are modified to form a beak, certain parts of which, especially the prementum, are much lengthened. Since the whole structure is, to some degree, retractile (and thus hidden), only the galea is used; this is attached to the base of the maxillary palpus, is constant in length and is generally visible. The thorax is uniform in shape though in *Agathis* it is subject to slight elongation. The notaulices are usually deeply impressed; when weak as in *Agathis nigra* and *Microdus lugubator*, they may sometimes be absent in some specimens. Propodeal sculpture is variable and of limited value; within a species, such as *Agathis glabricula*, it can be entirely rugose or, more frequently, it has smooth, polished lateral panels. The number of teeth on the outer side of the middle tibia of *Agathis* is fairly constant; sometimes there are sufficient teeth (8–10, as in *fulmeki*) to be of diagnostic importance. In *Agathis* it is essential to examine the claws for the presence or absence of a lobe or tooth.

Venation is used very little to separate species. In *Microdus* the radius (*Rs*) is sometimes characteristically curved on the side towards the stigma, and in one species, *cingulipes*, the curvature is so pronounced as to be diagnostic. The shape of the second submarginal cell (referred to herein as the areolet) is virtually uniform in *Microdus*, but in *Agathis* it is variable, and can be intraspecifically either triangular or distinctly four-sided; rarely, as in *Agathis anglica*, the four-sided condition is so pronounced that it always retains its distinctiveness. Less variable and more reliable in separating species of *Agathis* is the ratio between the two abscissae of the postmarginalis (Fig. 67). This vein is the distal extension of the stigma along the edge of the wing known as *R*<sub>1</sub>; sometimes it continues beyond the point where it is joined by the radius (*Rs*) and thus becomes composed of two abscissae. The distal abscissa is sometimes so long as to be diagnostic, as in *Agathis minuta*.

In *Agathis*, the gaster rarely provides characters of taxonomic value, being in greater part smooth and polished. In *Microdus*, however, it frequently has sculpture that is specific, though variable in degree of intensity and definition. *Earinus gloriatorius* demonstrates the unreliability of gastral sculpture in the Agathidinae; in this species tergites 2+3 are sometimes smooth and polished, sometimes conspicuously rugose, with every intermediate condition.

Ovipositor length is fairly uniform and of little use in the identification of species. There is nearly always considerable distortion in the apical tergites of dried specimens so that the actual length of the ovipositor is difficult to determine; the length of the ovipositor sheaths is more easily assessed and it is this length compared with that of the whole body that is mentioned in the descriptions.

The morphological terms used in this revision are based on those of Richards (1977) and Eady (1974). The fused second and third tergites of the gaster are referred to as 'tergites 2+3' because, in the majority of braconids, these two tergites have the appearance of a single segment, morphologically bipartite only by the presence of two lateral spiracles.

## Biology

As far as is known species of Agathidinae are internal parasites of lepidopterous larvae, but their biology has received little attention. There are a few exceptions, however. Simmonds (1947) described the life history of *Agathis vulgaris* (Cresson), a parasite of *Loxostege sticticalis* (L.), the sugar-beet web-worm in North America, and gave a detailed account of the morphology of the early stages of the parasite and an assessment of its value in biological control. Simmonds considered *Agathis vulgaris* to be an important parasite of its host and in fact found it to be the most frequently bred parasite in his experiments.

Dondale (1954) described the biology of *Microdus dimidiator* Nees von Esenbeck under the name *Agathis laticinctus* Cresson (Krombein *et al.*, 1979: 193). It is one of the parasites attacking the eye-spotted bud moth, *Spilopota ocellana* (Denis & Schiffermüller), an orchard pest in temperate North America. According to Dondale, the eggs of the parasite are deposited within the host during August and by early September have given rise to polypod, first-stage larvae which then enter a winter diapause. The overwintering larvae can be found within the host-caterpillars until the following July. The host-caterpillar reaches maturity and spins its



cocoon in late June or early July; the larva of the parasite then bores its way out and feeds externally on the juices of the host during a period of three or four hours, finally destroying it. Dondale does not consider *Microdus dimidiator* to be a particularly successful parasite but his paper, with its excellent illustrations of larval structures, is a notable contribution to the biology of *Microdus*.

Thorpe (1933) gave a brief account of the biology of *Microdus pumilus* Ratzeburg, a parasite of *Coleophora laricella* (Hübner), the larch case-bearer. He figured the first and second instar larvae of the parasite but had no material of the later stages. He found *Microdus pumilus* to be very rare in England and, in spite of breeding a wide range of parasites from the host, obtained it only from the Forest of Dean, Gloucestershire. Host-material from the south of France, on the other hand, produced *pumilus* in abundance, the parasite reaching a level of 12 per cent, the adults emerging in June. The first instar of the parasite diapauses through the winter within its host and in this respect resembles *Microdus dimidiator*. According to Tobias (1964), one of the most serious pests of agriculture in Armenia is the Mallow moth, *Pexicopia* (*Pectinophora*) *malvella* (Hübner). Over a number of years parasites of this moth were bred by A. S. Avetyan, among them *Agathis malvacearum* Latreille. Tobias does not assess the significance of *malvacearum* in the control of *Pexicopia malvella* and used Avetyan's bred material mainly to study the parasite's seasonal variability in size and colour.

The Agathidinae, apart from *Agathis vulgaris* (mentioned above), have not been used in biological control in the tropics, consequently the literature provides only casual information on life-cycles. Gupta (1964), however, bred specimens of an *Agathis* sp. from the larvae of *Holcocera pulvereana* Meyrick, the Lac predator. These were sent to C. F. W. Muesebeck who identified them as *Agathis festiva* Muesebeck, a parasite of the Oriental fruit moth, *Grapholita molesta* Busck, in China. Gupta states that nothing much is known about the biology of *festiva*, and suggested that it is hardly more than an occasional parasite of *pulvereana* but that it may also parasitise other lepidopterous larvae occupying similar habitats.

## Host records

HOST	PARASITE
<b>LEPIDOPTERA</b>	
<b>BLASTOBASIDAE</b>	
<i>Blastobasis lignea</i> Walsingham	<i>Microdus rugulosus</i>
<b>COLEOPHORIDAE</b>	
<i>Coleophora granulata</i> Zeller	<i>Agathis artemesiana</i>
<i>Coleophora flavipennella</i> (Duponchel)	<i>Microdus lugubator</i>
<i>Coleophora frischella</i> (L.)	<i>Microdus cingulipes</i>
<i>Coleophora glaucicolella</i> Wood	<i>Agathis minuta</i>
<i>Coleophora halophyella</i> Zimmerman	<i>Agathis asteris</i>
<i>Coleophora hemerobiella</i> (Scopoli)	<i>Microdus lugubator</i>
<i>Coleophora laricella</i> (Hübner)	<i>Microdus pumilus</i>
<i>Coleophora lutipennella</i> (Zeller)	<i>Microdus lugubator</i>
<i>Coleophora meridionella</i> Klimesch	<i>Agathis meridionellae</i>
<i>Coleophora troglodytella</i> (Duponchel)	<i>Agathis glabricula</i>
<b>GELECHIIDAE</b>	
<i>Anarsia eleagnella</i> Kuznetsov	<i>Baeognatha armeniaca</i>
<i>Apodia bifractella</i> (Duponchel)	<i>Agathis tibialis</i>
<i>Caryocolum fraternella</i> (Douglas)	<i>Microdus cingulipes</i>
<i>Chrysoesthia hermannella</i> (Fabricius)	<i>Agathis meridionellae</i>
<i>Chrysoesthia sexguttella</i> (Thunberg)	<i>Agathis meridionellae</i>
<i>Metzneria lappella</i> (L.)	<i>Agathis varipes</i>
<i>Pexicopia malvella</i> (Hübner)	<i>Agathis malvacearum</i>
<i>Ptocheuusa paupella</i> (Zeller)	<i>Agathis tibialis</i>
<i>Recurvaria nanella</i> (Denis & Schiffermüller)	<i>Baeognatha armeniaca</i>



## NOCTUIDAE

*Agrochola circellaris* (Hufnagel)  
*Agrochola lota* (Clerck)  
*Atethmia centrago* (Haworth)

*Earinus nitidulus*  
*Earinus nitidulus*  
*Earinus nitidulus*

## OECOPHORIDAE

*Agonopterix ciliella* (Stainton)  
*Agonopterix heracliiana* (L.)

*Earinus gloriatorius*  
*Earinus gloriatorius*

## PYRALIDAE

*Eurrhpara hortulata* (L.)  
*Myelois cirrigerella* (Zincken)  
*Pyrausta aurata* (Scopoli)

*Cremnops desertor*  
*Agathis varipes*  
*Agathis griseifrons*

## SESIIDAE

*Conopia spheciformis* (Denis & Schiffermüller)

*Cremnops desertor*

## TINEIDAE

*Morphaga boleti* (Fabricius)  
*Triaxomera parasitella* (Hübner)

*Microdus calculator*  
*Microdus calculator*

## TORTRICIDAE

*Cydia molesta* (Busck)

*Agathis festiva*  
*Microdus rufipes*

*Cydia pomonella* (L.)

*Microdus conspicuus*  
*Cremnops desertor*

*Cydia funebrana* (Treitschke)  
*Dichrorampha acuminatana* (Lienig & Zeller)  
*Epinotia mercuriana* (Frölich)  
*Epiblema scutulana* (Denis & Schiffermüller)  
*Gypsonoma dealbana* (Frölich)  
*Hedya nubiferana* (Haworth)  
*Pammene regiana* (Zeller)  
*Rhopobota ustomaculana* (Curtis)  
*Rhyacionia buoliana* (Denis & Schiffermüller)  
*Spilonota ocellana* (Denis & Schiffermüller)

*Microdus conspicuus*  
*Baeognatha armeniaca*  
*Microdus tumidulus*  
*Agathis anglica*  
*Microdus clausathalianus*  
*Microdus rufipes*  
*Microdus rufipes*  
*Microdus conspicuus*  
*Microdus conspicuus*  
*Microdus rufipes*  
*Microdus dimidiator*  
*Microdus fortipes*  
*Microdus rufipes*  
*Microdus dimidiator*

*Tortrix viridana* (L.)

Most of the above names are based on Kloet & Hincks (1972).

## AGATHIDINAE

DIAGNOSIS. Disco-cubital vein ( $Rs+M$ ) mostly undeveloped; hence 1st discoidal cell and 1st submarginal cell confluent, except in *Earinus* Wesmael; 2nd submarginal cell usually very small, triangular or subtriangular, forming an areolet (Fig. 50); when large (not much!) then 4-sided and often with accessory vein arising from outer side of 2nd transverse cubitus ( $2rm$ ) (*Disophrys-Cremnops* genus-group); 2nd transverse cubitus absent in *Baeognatha* Kokujev; hence no closed areolet in this genus; radial cell always short, mostly narrow, terminating far proximal to apex of fore-wing (Figs 50, 55, 60).

Head in facial view elongate (*Disophrys-Cremnops* genus-group); less frequently transversely elliptical (*Microdus*). Mouth-parts mostly lengthened and drawn out in form of beak; maxillary palpus 5-segmented; labial palpus 4-segmented; in *Microdus* segment 3 of labial palpus sometimes so small that palpus appears to be 3-segmented.

Thorax of generalised form except in highly specialised western Palaearctic *Rhamphagathis* Tobias. Pronotum with deep pit on each side, separated internally by fenestra. Propodeum variable; strongly, almost symmetrically areolated by raised keels (*Disophrys-Cremnops* genus-group) and then spiracle elongate; smooth to rugose with at most two longitudinal keels and spiracle circular (*Agathis-Microdus* genus-group).

Gaster usually highly polished, smooth but tergites 2+3 often sculptured in *Microdus*; in the Afrotropic-

al *Braunsia* Kriechbaumer, related to *Microdus*, the gaster shows a highly characteristic sculpture of strong striation. Spiracles of tergite 1 situated on dorsal plate. Ovipositor variable in length.

Based on knowledge of a relatively small sample of the subfamily, the above description has necessarily a restricted value. A study of the virtually unknown fauna of Australia and South America would certainly call for modifications.

The position of the Agathidinae with regard to the other braconid subfamilies has been defined by van Achterberg (1976). So far there is no evidence to contest the assertion that the Agathidinae can be separated from all other subfamilies by the venation of the fore-wing: the short radial cell in combination with the small second submarginal cell provides a character not found elsewhere in the Braconidae. This character is in general supported by the elongation of the head.

Van Achterberg (1984) has given a more up-to-date review of the phylogeny of the Braconidae based upon a comprehensive cladistic analysis.

### Key to European genera

- 1 Hind claw cleft; frons with sharp keel or rounded ridge between external side of antennal insertion and lateral ocellus; inner spur of hind tibia very long, reaching middle of basal segment of hind tarsus ..... 2
- Hind claw not cleft; frons unarmed or much more often with basal lobe or tooth; inner spur of hind tibia shorter, not reaching middle of basal segment of hind tarsus ..... 3
- 2 Body entirely fulvous; fore-wing having dappled appearance, with broad, hyaline fascia beneath half yellow stigma and paler at base and apex; maxillary palpus in female with long bristles that are longer than palpal segments; ovipositor about as long as body  
*CREMNOPS* Förster (p. 191)
- Body variable in colour but always partly blackened; fore-wing without dappled appearance and at most with pale, hyaline streak beneath stigma; maxillary palpus of female with only very short hairs; ovipositor very short, projecting only slightly beyond apex of gaster  
*DISOPHRYS* Förster (p. 190)
- 3 First submarginal cell separated from 1st discoidal cell by a fully sclerotised vein (Fig. 67); sternaulus absent ..... *EARINUS* Wesmael (p. 226)
- First submarginal cell more or less fused with 1st discoidal cell; sternaulus present (rarely reduced to a fine groove or virtually absent and then head in facial view elongate) ..... 4
- 4 Fore-wing without a closed areolet (2nd submarginal cell) ..... *BAEOGNATHA* Kokujev (p. 229)
- Fore-wing always with a closed areolet (2nd submarginal cell) ..... 5
- 5 Middle lobe of mesoscutum deeply hollowed out to form a wide trough, each side of which shows anteriorly as a blunt projection or shoulder; clypeus in profile in form of a short snout; mandible broadened, flattened, slightly concave on external side  
*RHAMPHAGATHIS* Tobias (p. 214)
- Middle lobe of mesoscutum of ordinary form, evenly convex in front; clypeus in profile not or only very slightly projecting; mandible not thus broadened or concave externally ..... 6
- 6 Head in facial view always elongate; mouth parts almost always lengthened in form of beak, the galea at least 1.5 times longer than wide. (In *minuta*, which has a very short galea, the head in facial view is subtriangular.) ..... *AGATHIS* Latreille (p. 192)
- Head in facial view strongly transverse, rarely slightly lengthened as in *linguarius*; mouth parts never lengthened in form of beak, galea not longer than wide  
*MICRODUS* Nees von Esenbeck (p. 215)

### Synonymic list of species

*AGATHIS* Latreille  
*achterbergi* sp. n.  
*anchisiades* sp. n.  
*anglica* Marshall  
*albanica* Fischer syn. n.  
*ariadne* sp. n.  
*artemesiana* Fischer  
*assimilis* Kokujev  
*asteris* Fischer  
*breviseta* Nees von Esenbeck

- fulmeki* Fischer  
*glabricula* Thomson  
     *albicostellae* Fischer **syn. n.**  
*glaucoptera* Nees von Esenbeck  
*gracilipes* Hellén  
*griseifrons* Thomson  
     *laticarpa* Telenga **syn. n.**  
*malvacearum* Latreille  
*melpomene* **sp. n.**  
*meridionellae* Fischer  
*minuta* Niezabitowski  
*montana* Shestakov  
*nigra* Nees von Esenbeck  
     *testaceipes* Fischer **syn. n.**  
*pappei* **sp. n.**  
*pedias* **sp. n.**  
*persephone* **sp. n.**  
*polita* **sp. n.**  
*rostrata* Tobias  
*rufipalpis* Nees von Esenbeck  
*semiaciculata* Ivanov  
*syngenesiae* Nees von Esenbeck  
*taurica* Telenga  
*tibialis* Nees von Esenbeck  
*umbellatarum* Nees von Esenbeck  
     *kolazyi* Fischer **syn. n.**  
*varipes* Thomson  
*zaykovi* **sp. n.**
- BAEOGNATHA** Kokujev  
     *nigra* Telenga  
     *armeniaca* Telenga
- CREMNOPS** Förster  
     *desertor* (L.)  
         *deflagrator* (Spinola)
- DISOPHRYS** Förster  
     *caesa* Klug  
         *anthracina* Kriechbaumer **syn. n.**
- EARINUS** Wesmael  
     *elator* (Fabricius)  
         *nitidulus* Nees von Esenbeck **syn. n.**  
         *thoracicus* Nees von Esenbeck **syn. n.**  
     *glorimatorius* (Panzer)  
         *affinis* Wesmael  
         *varicoxis* Wesmael **syn. n.**  
         *delusor* Wesmael **syn. n.**  
         *tuberculatus* Wesmael **syn. n.**  
         *bicingulatus* Thomson **syn. n.**  
         *ochropes* Lyle **syn. n.**  
         *transversus* Lyle
- MICRODUS** Nees von Esenbeck  
     *calculator* (Fabricius)  
         *abscissus* Ratzeburg  
     *cingulipes* Nees von Esenbeck  
     *clausethalianus* (Ratzeburg)  
     *conspicuus* Wesmael  
         *arcuatus* Reinhard **syn. n.**  
         *zonatus* (Marshall)  
     *dimidiator* Nees von Esenbeck  
     *eriphyle* **sp. n.**



*fortipes* Reinhard  
*linguarius* Nees von Esenbeck  
*lugubator* Ratzeburg  
*nugax* Reinhard  
*pumilus* Ratzeburg  
*rufipes* Nees von Esenbeck  
*rugulosus* Nees von Esenbeck  
*tumidulus* Nees von Esenbeck  
*tegularis* Thomson **syn. n.**  
*zaykovi* **sp. n.**

**RHAMPHAGATHIS** Tobias  
*nasicornis* Telenga

### **DISOPHRYS** Förster

*Disophrys* Förster, 1862: 246. Type-species: *Ichneumon inculcator* Linnaeus sensu Förster, 1862 (= *Agathis caesa* Klug).

*Diophrys* Kriechbaumer, 1898: 181. [Unjustified emendation.]

I have examined the original specimen of *Ichneumon inculcator* Linnaeus which is in the LC, London. It is an ichneumonid and as such has been dealt with by Fitton (1978) and van Rossem (1969).

Förster makes no mention of what material he had but merely cites *Ichneumon inculcator* L. as the type-species of *Disophrys*, adding a reference to Nees von Esenbeck: 'Agathis inc. Hym.ichn.aff.Mon. 1: 138'.

In view of the above, *Disophrys* must either be considered a genus in the Ichneumonidae, or interpreted as actually described by Förster. The latter course has been followed here but ratification will be required by the International Commission for Zoological Nomenclature.

The oldest available name for the species misidentified by Förster is *caesa* Klug, 1835, described from a female taken by Walzl at Puerto Real in Andalusia, Spain. This specimen has been examined; it bears a label, presumably in Klug's handwriting: 'Andalusien, Walzl d.' and another, red, marked 'type'. I have labelled this specimen as '*Agathis caesa* Klug. Holotype ♀, G. E. J. Nixon, 1984', this being the name under which it was originally described.

**DIAGNOSIS.** Head in facial view elongate. Galea of maxillary palpus fully 3 times longer than greatest width; labial palpus 4-segmented; two apical segments subequal. Ocelli in high triangle; posterior tangent to anterior ocellus not touching posterior pair. Antennal sockets on inner side each with raised, sublammellar tubercle; in frontal view of head, space between antennal sockets shows as bilobed projection. Frons on each side with raised ridge. Notaulices deeply impressed. Areolet of fore-wing 4-sided; outer side of 2nd transverse cubitus (*r-m*) with stub of vein; radius leaving stigma in basal third; distal abscissa of postmarginalis about half as long as proximal abscissa. Propodeum with strongly raised ridges enclosing areas of uneven size; spiracle large, subelliptical. Inner spur of hind tibia reaching middle of basal segment of hind tarsus; outer side of middle tibia without teeth; claws cleft. Gaster smooth, polished. Ovipositor projecting only slightly beyond apex of gaster.

The above diagnosis is based on the type-species and cannot therefore encompass the range of structure that may later be found to be acceptable for a more realistic definition of the genus.

Although numerous species of *Disophrys* have been described from the tropics (Shenefelt, 1970), only four are known from the Palaearctic region. As well as *caesa*, these are *calcaratrix* Telenga (1955), *dissors* Kokujev (1903) and *manifesta* Kokujev (1903), all from Central Asia and all represented by at least one example in the BMNH. Examination of these three species suggests that modifications of the generic concept of *Disophrys* will include variation in the surface sculpture of the hind tibia (*manifesta*), the thickness and vestiture of the longer hind tibial spur (*calcaratrix*), and the strength and sharpness of the frontal keel (*manifesta*).

### ***Disophrys caesa* (Klug)**

*Agathis caesa* Klug, 1835: 89. Holotype ♀, SPAIN (MNHU) [examined].

[*Ichneumon inculcator* Linnaeus; Förster, 1862: 246. Misidentification.]

*Disophrys caesus* (Klug) Marshall, 1890: 574.

*Diophrys* [sic] *anthracina* Kriechbaumer, 1898: 185. LECTOTYPE ♂, SPAIN (ZSBS), here designated [examined]. **Syn. n.**

*Disophrys anthracina* Kriechbaumer; Szépligeti, 1904: 124.

♂ ♀, 8–11 mm long (excluding ovipositor). Body varying in colour from almost entirely red (holotype of *caesa*) to entirely black (*anthracina*). Hind tibia varying from black and red to entirely black. Basal half of fore-wing either entirely infumate or with median and submedian cells almost hyaline (lectotype of *anthracina*).

♀. Head from above strongly transverse; in facial view somewhat variable; in nominate form decidedly elongate but less so in central European examples. Face strongly raised along middle line, covered with much coarse punctuation or, towards antennal insertions, rugose-punctuation; face also much deepened at site of toruli. Frontal ridge strongly raised, sharp. Galea about 0.75 times longer than malar space. Antenna with 40–48 segments; flagellum tapering apically; middle segments almost transverse. Mesoscutum in profile sloping very gradually towards pronotum in Spanish specimens; in examples from further eastwards, the slope becomes steeper; this is correlated with smaller size and increase of red colour. Prepectal keel strong, well defined. Sternaulus in form of a wide trough, crossed by very strong rugae. Hind coxa above very coarsely rugose-reticulate; rugose area often separated from the weak oblong trough alongside it by a raised ridge; hind femur densely covered with shallow pits; hind tibia much roughened through dense covering of tiny, oblong tubercles; inner spur of hind tibia unmodified, about 1.5 times longer than outer one and reaching only slightly beyond middle of basal segment of hind tarsus. Gaster smooth, polished. Ovipositor sheath about 3 times longer than basal segment of hind tarsus.

♂. Like female except for sexual differences.

#### MATERIAL EXAMINED (from the Iberian Peninsula)

**Portugal:** 1 ♂, near Coimbra, Beira littoral, 22.vii.1970 (*Pronk*) (RNH). **Spain:** 1 ♀, Albarracin (RNH); 1 ♀, Ost Peja, 11.vii.1894 (RNH); 1 ♀ (holotype of *caesa*), Andalucia, Puerto Real (*Waltl*) (MNHU); 5 ♂, 3 ♀, Barcelona, Calella d. Costa, vi.1971 (*Bouček*) (BMNH); 1 ♀, Burgos, 26.vi.1961 (RNH); 1 ♂, 1 ♀, Jaen, Las Correderas (RNH); 2 ♂ (lectotype and paralectotype of *anthracina*), Castille, Cuenca, 1896 (*Korb*) (ZSBS).

#### Other material examined

8 ♂, 34 ♀. **Austria, Greece, Hungary, Turkey, Yugoslavia** (all BMNH).

COMMENTS. Two males of the original material collected by Korb in Castille, Cuenca, and sent by him to Kriechbaumer, are in ZSBS; they agree with the original description in all respects except sex (Kriechbaumer stated that he had three females but found difficulty in sexing specimens of *Disophrys*). A male labelled 'Castilien, Cuenca, Korb 1896' is here designated as lectotype; the second specimen is labelled paralectotype.

### CREMNOPS Förster

*Cremnops* Förster, 1862: 246. Type-species: *Ichneumon desertor* Linnaeus, by monotypy.

Achterberg (1982: 136) has caused confusion concerning the correct identity of the type-species of *Cremnops* and questions whether the latter is valid or a synonym of *Vipio* Latreille (1804: 173). His argument hinges on whether *Ichneumon desertor* L., 1758 and what he calls *Ichneumon desertor* F. (recte *I. desertor* L. sensu F., 1775) refer to the same species. He considers that they represent a single species as is clear from his statement '*Ichneumon desertor* Fabricius is not a separate species, since Fabricius cited in his first description only the original description of *Ichneumon desertor* Linnaeus, 1758, together with the reference to Linnaeus' description. Therefore there cannot be any doubt that there is no separate species named *Ichneumon desertor* Fabricius. This fact was overlooked by Bradley (1919: 59) when he stated that "the type of *Vipio* Latreille is *Ichneumon desertor* Fabricius, not of Linnaeus"'. Achterberg continues 'Because nomenclatorily *Ichneumon desertor* Fabricius is actually *I. desertor* Linnaeus, 1758, the genus *Vipio* Latreille . . . becomes . . . a senior synonym of *Cremnops* Förster, 1862'. Obviously the truth of this statement depends on the validity of his previous statement. It can be shown that Achterberg's reasoning is false and that he misinterpreted Bradley (1919) as well as several earlier workers. He weakens his argument by stating that 'At present in the Fabricius collection there are specimens under *desertor* which are not conspecific (or congeneric) with *I. desertor* Linnaeus and this indicated only that Fabricius had difficulties in interpreting *I. desertor* Linnaeus'. This remark does not only indicate that Fabricius had trouble in interpreting *I. desertor* Linnaeus but implies also that he misidentified the Linnaean species and that *I. desertor* L. sensu F., 1775, could in fact represent a different taxon. Earlier workers such as Latreille (1804), Nees von Esenbeck (1834) and Förster (1862) also considered that Fabricius had misidentified *desertor* L. and that the species he had belonged to a different group of Braconidae. Latreille (1804) placed what he called *desertor* F. (recte *desertor* L. sensu F.) with two other species in his genus *Vipio*. The Fabrician interpretation of *desertor* L. has been associated with this generic name ever since, having been cited as the type-species of *Vipio* by Förster (1862). *Ichneumon desertor* L., on the other hand, has long

been recognised as an agathidine and is the type-species of *Cremnops* by monotypy. Since it is obvious that *I. desertor* L. and *I. desertor* L. sensu F. refer to radically different species, Achterberg's (1982) contention that *Vipio* and *Cremnops* are synonyms because they have the same type-species is incorrect.

The critical references in the taxonomic history of the name *desertor* are as follows.

Linnaeus, 1758: 563. Original description of *Ichneumon desertor*.

Fabricius, 1775: 334. *Ichneumon desertor* L. sensu F., 1775.

Latreille, 1804: 173. *Ichneumon desertor* L. sensu F., 1775. Transferred to genus *Vipio* Latreille.

Förster, 1862: 235. *Ichneumon desertor* L. sensu F., 1775. Cited as type-species of *Vipio* Latreille.

Spinola, 1808: 101. *Bracon deflagrator*, erected (unnecessarily) as replacement name for *I. desertor* L.

Nees von Esenbeck, 1834: 125. *Bracon deflagrator* Spinola transferred to genus *Agathis*, with *I. desertor* L. wrongly placed as junior synonym.

Förster, 1862: 246. *Agathis deflagrator* (wrongly attributed to Nees von Esenbeck) cited as type-species of *Cremnops*. Correct citation should have been '*Agathis deflagrator* (Spinola) sensu Nees, 1834'.

DIAGNOSIS. ♂ ♀. Head in facial view elongate. Mouth parts lengthened; galea fully twice as long as wide. A blunt keel, an extension of the outer rim of antennal socket, extends obliquely across frons half way towards posterior ocellus. Frons bilobed between antennal insertions. Propodeum almost symmetrically areolated by sharply raised keels; propodeal spiracle narrowly oval. Outer side of middle tibia without trace of teeth (cf. *Agathis* and *Microdus*). First abscissa of mediella of hind wing much shorter than second; areolet of fore-wing 4-sided with stub of vein arising from outer side of 2nd transverse cubitus. Gaster polished, smooth.

### *Cremnops desertor* (Linnaeus)

*Ichneumon desertor* Linnaeus, 1758: 563. Holotype ♀, EUROPE (LC) [examined].

*Bracon deflagrator* Spinola, 1808: 101. [Unnecessary replacement name for *I. desertor* Linnaeus.]

*Agathis deflagrator* (Spinola) Förster, 1862: 246. [Attributed to Nees von Esenbeck, 1834: 139.]

♂ ♀, 6–8 mm long (excluding ovipositor). Entirely bright fulvous. Wings with a broad hyaline fascia at middle and two large, almost confluent spots at apex of wing.

♀. Bristles of palpi upstanding, fully as long as palpal segments. Ovipositor sheath fully 0.66 times as long as gaster.

♂. Bristles of palpi of ordinary form, much shorter than palpal segments.

#### MATERIAL EXAMINED

9 ♂, 20 ♀. All from southern Europe. Tobias (1976) gives the range as Palaearctic.

HOST. I have seen no bred material. Tobias (1976) gives *Cydia* (*Grapholita*) *pomonella* L. (Tortricidae), *Eurrhyncha hortulata* (L.) (Pyralidae) and *Conopia* [*Syanthodon*] *spheciformis* (Denis & Schiffermüller) (Sesiidae) as hosts, which include such a wide range of lepidopterous families that I doubt if all can be correct.

COMMENTS. The single European species can be easily recognised by its colour and by the long palpal bristles of the female.

### AGATHIS Latreille

*Agathis* Latreille, 1804: 173 [no included species]; 1805: 175. Type-species: *Agathis malvacearum* Latreille, by subsequent monotypy.

DIAGNOSIS. Mostly black species, rarely entirely or partly marked with red. Head in facial view almost always elongate; if not markedly so then still clearly triangular. Ocelli always in a high triangle, the posterior tangent to the anterior ocellus not touching or cutting posterior pair. Antenna in the species under review never with more than 40 segments. Mouth parts characteristically lengthened, forming a beak. Notaulices almost always present. Propodeum without areolation but with two more or less distinct medial longitudinal keels; surface on each side of these keels usually smooth, polished; rarely surface of propodeum rugose all over. Spurs of hind tibia short, always less than half as long as basal segment of hind tarsus; middle tibia with at least two teeth on its outer side in about apical third. Hind claw with or without a lobe or tooth but never cleft; each of the posterior metasternal foramina that receive the insertion of the hind coxae open on its inner side. First discoidal cell and first cubital cell confluent; 2nd cubital cell always



small, most triangular, rarely obviously 4-sided. First tergite varying from entirely smooth to rugose-striate; tergites 2+3 rarely striate all over (*semiaciculata* Ivanov); sometimes with variable amount of broken rugose-striation distal to, and to sides of, faint, transverse, blister-like swelling. Ovipositor at least as long as gaster.

### Key to species (females)

- 1 Antennal sockets separated on inner side by distance equal to diameter of anterior ocellus.  
Species strongly marked with red; galea short, 1.5 times longer than wide  
*syngenesiae* Nees von Esenbeck (p. 196)
- Antennal sockets united on inner side to form a single keel ..... 2
- 2 At least mesoscutum in greater part, or entirely, red ..... 3
- Mesoscutum black ..... 5
- 3 Head in dorsal view strongly produced backwards behind eyes; temples strongly swollen (Fig. 26) ..... *malvacearum* Latreille (p. 202)
- Head in dorsal view less produced backwards behind eyes; temples not, or hardly, swollen ..... 4
- 4 Head entirely black; galea 3.5 times longer than wide; frons in front of anterior ocellus jutting forwards and showing as a V- or U-shaped cavity; malar space slightly shorter than longer diameter of eye; areolet of fore-wing 4-sided; ovipositor sheath as long as body  
*umbellatarum* Nees von Esenbeck (p. 197)
- Head at least almost entirely red; galea 3 times longer than wide; frons in front of anterior ocellus not jutting forwards and at most with shallow dimple here; malar space distinctly longer than longer diameter of eye, 4:3; areolet of fore-wing stalked; ovipositor sheath about equal to length of gaster ..... *glaucoptera* Nees von Esenbeck (p. 195)
- 5 Mouth-parts much lengthened; galea at least 4 times longer than its basal width ..... 6
- Mouth-parts less lengthened; galea at most 3.5 times longer than its basal width ..... 8
- 6 Hind claw with strong lobe (Fig. 47); notaulices deeply impressed; at most a shallow dimple in front of anterior ocellus ..... 7
- Hind claw without a lobe though a little, and abruptly, widened at base (Fig. 45).  
Head in facial view weakly elongate (Fig. 11); galea 4–5 times longer than basal width; notaulices often weak, sometimes almost obliterated ..... *nigra* Nees von Esenbeck (p. 203)
- 7 Galea 6 times longer than its middle width; outer side of middle tibia with about 30 teeth and appearing densely spinose ..... *taurica* Telenga (p. 204)
- Galea 4 times longer than its middle width; outer side of middle tibia with 6–8 teeth, some of them in pairs ..... *zaykovi* sp. n. (p. 204)
- 8 Hind femur greatly lengthened, about 4.5 times longer than wide. Galea very short, only a little longer than wide ..... *gracilipes* Hellén (p. 212)
- Hind femur not more than 3 times longer than wide ..... 9
- 9 In front of anterior ocellus a V- or U-shaped, or parallel-sided, cavity, bounded by a ridge and prolonged below to form a keel between antennal sockets ..... 10
- In front of anterior ocellus at most a shallow, subtriangular impression or dimple, or surface virtually flat; virtually no keel between antennal sockets or, if one is weakly indicated, then it is not continuous with any ante-ocellar impression that may be present ..... 23
- 10 Galea very short, inconspicuous, not more than 1.33–1.50 times longer than wide ..... 11
- Galea longer, at least twice as long as wide ..... 13
- 11 Small species, 2.8–3.0 mm; head in facial view subtriangular (Fig. 29).  
Impression in front of anterior ocellus shallow; distal abscissa of postmarginalis hardly shorter than proximal abscissa ..... *minuta* Niezabitowski (p. 208)
- Larger species, at least 4.0 mm; head in facial view markedly elongate.  
Hind claw with conspicuous lobe; distal abscissa of postmarginalis about 0.75 times longer than proximal abscissa ..... 12
- 12 Ovipositor sheath not longer than gaster, about 1.5 times longer than hind tibia; flagellum somewhat thickened medially and thence tapering to apex, not markedly bristly  
*brevisetia* Nees von Esenbeck (p. 197)
- Ovipositor sheath very distinctly longer than gaster and about twice as long as hind tibia; flagellum thinner, markedly bristly.  
Cavity in front of anterior ocellus deeper and more nearly parallel-sided than in *brevisetia*  
*assimilis* Kokujev (p. 198)

- 13 Enclosed cavity in front of anterior ocellus U-shaped, almost jutting forwards as though on a prominence; stigma longer; radial cell longer ..... 14
  - Enclosed cavity in front of anterior ocellus only vaguely V- or U-shaped, not jutting forwards but lying in same plane as keel below it; stigma shorter; radial cell shorter.  
Distal abscissa of postmarginalis at least 0.66 times longer than proximal abscissa; hind claw with conspicuous lobe ..... 15
- 14 Head in dorsal view strongly produced backwards behind eyes; temples strongly swollen (Fig. 26); head in facial view much lengthened (Fig. 4); hind claw with basal tooth  
*malvacearum* Latreille (p. 202)
  - Head in dorsal view less produced backwards behind eyes; temples hardly swollen; head in facial view much less lengthened, subtriangular (Fig. 16); hind claw with large basal lobe  
*varipes* Thomson (p. 199)
- 15 Notaulices virtually obliterated, at most a hardly visible line marking their course.  
Hind claw with distinct lobe ..... 16
  - Notaulices clearly defined ..... 17
- 16 Galea distinctly longer than malar space; a hardly visible line indicates course of notaulices; outer side of middle tibia with 8-9 irregularly spaced, thick teeth; thorax more elongate in profile ..... *polita* sp. n. (p. 206)
  - Galea shorter, hardly as long as malar space; notaulices absent; outer side of middle tibia with 4-5 teeth arranged more or less in row; thorax less elongate in profile  
*persephone* sp. n. (p. 206)
- 17 Segment 3 of middle tarsus very short, about 1.25 times longer than wide.  
Tergite 1 sculptured right to apex ..... 18
  - Segment 3 of middle tarsus at least 1.5 times longer than wide ..... 19
- 18 Ovipositor sheath about as long as gaster; head in facial view not strikingly lengthened  
*achterbergi* sp. n. (p. 208)
  - Ovipositor sheath nearly 1.5 times longer than gaster; head in facial view strikingly lengthened (Fig. 6) ..... *anchisiades* sp. n. (p. 207)
- 19 V-shaped cavity in front of anterior ocellus narrow, deep.  
Outer side of middle tibia with 7-8 teeth ..... *rufipalpis* Nees (p. 199)
  - V-shaped cavity in front of anterior ocellus less narrow, somewhat shallow ..... 20
- 20 Thorax in profile more elongate (Fig. 42); outer side of middle tibia with 6-10 closely spaced teeth.  
Malar space very distinctly shorter than longer diameter of eye ..... 21
  - Thorax in profile much less elongate; outer side of middle tibia with 4-5 teeth arranged more or less in a row.  
Distal abscissa of postmarginalis obviously shorter than proximal abscissa ..... 22
- 21 Galea clearly longer than malar space, polished and virtually smooth; hind claw with conspicuous lobe and with deep cleft between lobe and claw proper; 3-4 distal segments of maxillary palpus markedly yellowish; distal abscissa of postmarginalis virtually equal to proximal abscissa ..... *fulmeki* Fischer (p. 198)
  - Galea clearly shorter than malar space, dull, coriaceous; hind claw with only weak basal projection and no cleft between this and claw proper; maxillary palpus blackish throughout; distal abscissa of postmarginalis a little shorter than proximal abscissa ..... *pedias* sp. n. (p. 211)
- 22 Head in facial view wide across clypeus (Fig. 1), longer; hind femur less swollen; antenna with 26 segments; tergite 1 with clearer indication of sculpture over apical two-thirds  
*ariadne* sp. n. (p. 206)
  - Head in facial view much less wide across clypeus, shorter, somewhat triangular; tergite 1 highly polished over apical two-thirds; hind femur more swollen (Fig. 33); antenna with at most 23 segments ..... *tibialis* Nees von Esenbeck (p. 201)
- 23 Head in facial view hardly lengthened below eyes (Fig. 12); clypeus in lateral view of head markedly protuberant.  
Wings hyaline; mandibles of powerful build; hind claw without lobe ..... *pappei* sp. n. (p. 212)
  - Head in facial view always lengthened below eyes (sometimes nearly subtriangular); clypeus in lateral view of head not protuberant ..... 24
- 24 Sternaulus reaching both anterior and posterior margin of mesopleurum.  
Galea about 3 times longer than its widest part, somewhat abruptly narrowed in apical half; hind claw virtually without lobe ..... *rostrata* Tobias (p. 211)
  - Sternaulus, if present, not reaching both anterior and posterior margin of mesopleurum or, if it

- almost reaches anterior margin, then galea shorter (*semiaciculata*) or hind claw with conspicuous lobe (*melpomene*) ..... 25
- 25 Hind claw virtually without lobe, at most a denticle at apex of thickened, basal part.  
Distal abscissa of postmarginalis very short; tergite 1 sculptured right to apex ..... 26
- Hind claw with lobe; if weak (*anglica*), then areolet markedly 4-sided ..... 29
- 26 Sternaulus absent or represented by a hardly impressed furrow; thorax elongate, almost twice as long as wide, 44:25, as seen in profile.  
Species at most 2.5 mm excluding ovipositor; galea very distinctly longer than malar space, 7:4; flagellum distinctly thickened beyond middle ..... *asteris* Fischer (p. 209)
- Sternaulus clearly defined; thorax less elongate, at most 1.66 times longer than wide as seen in profile ..... 27
- 27 Galea shorter than malar space ..... 28
- Galea as long as, or slightly longer than, malar space.  
Face rather sharply narrowed below eyes in facial view (Fig. 28); ovipositor sheath about as long as propodeum plus gaster; basal, thickened part of hind claw sometimes with denticle at apex ..... *glabricula* Thomson (p. 209)
- 28 Flagellum distinctly thickened distal to middle and thence tapered to apex; segment 10 from apex about 1.25 times longer than wide; head seen from above, with face just out of view, longer.  
Ovipositor sheath short, about as long as gaster ..... *artemesiana* Fischer (p. 210)
- Flagellum not thus thickened distal to middle and not tapered to apex; segment 10 from apex fully 1.5 times longer than wide; head seen from above, with face just out of view, shorter, more transverse ..... *meridionellae* Fischer (p. 210)
- 29 Face densely pubescent.  
Hind femur entirely, or in greater part, reddened; hind claw with well-developed tooth (Fig. 44); virtually no dimple in front of anterior ocellus and no keel between antennal sockets ..... *griseifrons* Thomson (p. 202)
- Face with ordinary pubescence ..... 30
- 30 Length at most 3.5 mm excluding ovipositor ..... 31
- Length at least 4.0 mm excluding ovipositor ..... 32
- 31 Thorax less elongate (Fig. 41); hind femur blackish; lobe of hind claw in form of weak projection or angulation; antenna with 27–29 segments ..... *glabricula* Thomson (p. 209)
- Thorax more elongate; hind femur entirely reddish; lobe of hind claw in form of free projection; antenna with 23–24 segments ..... *montana* Shestakov (p. 213)
- 32 Basal half of tergites 2+3 closely striate all over ..... *semiaciculata* Ivanov (p. 205)
- Basal half of tergites 2+3 with at most very irregular striate-rugosity ..... 33
- 33 Hind claw with conspicuous lobe; radial cell longer (Fig. 50) ..... 34
- Hind claw with at most a weak, basal angulation; radial cell shorter (Fig. 49)  
Head in facial view much narrowed below eyes (Fig. 18); tergite 1 sculptured right to apex; tergites 2+3 usually with conspicuous, very irregular striate rugosity distal to basal, transverse swelling ..... *anglica* Marshall (p. 200)
- 34 Head in facial view subtriangular (Fig. 16); galea about as long as malar space  
*varipes* Thomson (p. 199)
- Head in facial view much narrowed below eyes; galea 1.33 to 1.50 times longer than malar space ..... *melpomene* sp. n. (p. 213)

*Agathis glaucoptera* Nees von Esenbeck

(Fig. 3)

*Agathis glaucoptera* Nees von Esenbeck, 1834: 128. Holotype ?♀, ITALY (lost).

♀, 7–8 mm long (excluding ovipositor). Almost entirely reddish yellow; ocellar region and scrobes blackish; mesosternum, mesopleurum and propodeal area black. Hind coxa varying from black to bright reddish yellow, like gaster; hind femur entirely reddish yellow.

Head in facial view markedly elongate; in this aspect differing from all other included species in that the face is only weakly narrowed towards the mouth (Fig. 3). Malar space about 1.25 times as long as longer diameter of eye. Inner rims of antennal sockets joined to form a keel that unites with a shallow, V-shaped impression in front of anterior ocellus. Anterior ocellus raised as though on a prominence. Antenna 31–33 segmented. Galea hardly twice as long as wide. Thorax in profile of generalised form. Notaulices deep but



not costate. Sternaulus deep, wide, strongly costate. Propodeum without clearly defined, longitudinal keel but with several coarse rugae in their place. Areolet of fore-wing small, stalked; stigma relatively elongate; distal abscissa of postmarginalis at least 0.66 times longer than proximal abscissa; anellus of hind wing joining anal cell above middle. Hind claw with large, conspicuous lobe; outer side of middle tibia with 1–2, or without, teeth; inner spur of hind tibia powerful, reaching middle of basal segment of hind tarsus. Gaster rather short. Tergite 1 about 1.33 times longer than wide at apex, smooth, polished. Ovipositor sheath about as long as gaster.

#### MATERIAL EXAMINED

**France:** 1 ♀, Perpignan, 10.vi.1976 (*G. D. Slob*) (RNH). **Turkey:** 1 ♀, Konya, 11.vi.1971 (*Kl. Warnke*) (RHN). **Yugoslavia:** 1 ♀, Macedonia, R. Reshik, (*J. Waterston*) (BMNH).

**Host.** Unknown.

**COMMENTS.** Marshall (1890) redescribed *glaucoptera* from a single female in poor condition but beyond doubt recognised the species correctly. Both Telenga (1955) and Tobias (1954; 1963) were in agreement with Marshall and these three authors have been followed here. *A. glaucoptera* is distinguished from all other species from the region by the shape of the head in facial view, in combination with the stalked areolet and the short ovipositor sheath. The point of emission of the anal vein in the hind wing is noteworthy and suggests that *glaucoptera* occupies a somewhat isolated position among the European species of *Agathis*.

### *Agathis syngenesiae* Nees von Esenbeck

(Figs 5, 20)

*Agathis syngenesiae* Nees von Esenbeck, 1814: 192, 194. Syntypes, GERMANY (lost).

♂ ♀, 4.5–5.6 mm (excluding ovipositor).

♀, Body much marked with red; head varying from almost black to almost entirely red. Prothorax, mesoscutum, propodeum and mesosternum entirely black. Gaster almost entirely red.

Head in facial view markedly elongate (Fig. 5); seen from above, strongly transverse and only shallowly emarginate behind (Fig. 20). Malar space equal to, or slightly longer than, longer diameter of eye. Mouth parts short for genus; galea hardly 1.5 times longer than wide. Antennal sockets not united on inner side to form a single keel but separated by a distance fully equal to diameter of anterior ocellus. Antenna with 25–27 segments. Thorax moderately elongate, in profile as 13:8. Notaulices generally rather shallow. Sternaulus usually distinct but sometimes almost wanting, not extending beyond middle of mesopleurum. Sculpture of propodeum varying from coarsely reticulate all over to vaguely punctate-reticulate; the two longitudinal keels of *Agathis* (s.str.) virtually wanting. Areolet of fore-wing triangular, almost petiolate; stigma more elongate than that of other species of region; radial cell very narrow; radius sometimes slightly curved inwards towards stigma; distal abscissa of postmarginalis as long as proximal abscissa. Hind claw with somewhat short, dentiform lobe; outer side of middle tibia with 2–3 widely spaced teeth; inner spur of hind tibia falling far short of middle of basal segment of hind tarsus. Tergite 1 about 1.25 times longer than its apical width, polished, smooth. Ovipositor sheath 1.33–1.5 times longer than body. Hypopygium very shallowly, broadly emarginate at apex.

♂. Inner and outer orbits pale marked (2 ex., Turkey), otherwise generally black. Posterior half of gaster blackened. Antenna with 25–26 segments.

#### MATERIAL EXAMINED

**France:** 1 ♀, Carpentras (*Teunissen*) (RNH); 2 ♀, 1 ♂, Landes, St Giron's Plage, on *Helychrysum stoechas* L. (*P. Pronk*) (RNH). **Germany:** 3 ♀, Ruthe Coll. (BMNH). **Holland:** 1 ♀, Terschelling (RNH); 1 ♀, Texel De Koog, pine forest, 6.ix.1969 (*L. Oosterweghel*) (RNH). **Portugal:** 1 ♀, Algarve, Val do Lobo, vii.1967 (*P. M. F. Verhoeff*) (RNH). **Spain:** 1 ♀, Cadiz, Jerez de la Frontera, viii.1967 (*P. M. F. Verhoeff*) (RNH). **Turkey:** 1 ♂, Uludag, viii.1962 (*Guichard & Harvey*) (BMNH); 2 ♀, 1 ♂, Bursa, near Karacabey, viii.1962 (*Guichard & Harvey*) (BMNH).

**Host.** Unknown.

**COMMENTS.** This species closely resembles *umbellatarum* in colour but the two species are very different. Whereas *umbellatarum* is a typical *Agathis*, *syngenesiae* is in some respects like species of *Microdus*. The form of the keel between the antennal insertions approaches the condition found in *Microdus*. So also does the strongly transverse head as seen from above. Nevertheless, the elongate head and the lengthened

mouth-parts relate *syngenesiae* more closely to *Agathis*. The form of the frons between the antennal insertions together with the short galea make the species easy to recognise.

***Agathis umbellatarum* Nees von Esenbeck**

*Agathis umbellatarum* Nees von Esenbeck, 1814: 195. Syntypes, GERMANY (lost).

*Agathis kolazyi* Fischer, 1959: 2. Holotype ♂, YUGOSLAVIA (ZM) [examined]. *Syn. n.*

♂ ♀, 4.5–5.0 mm long (excluding ovipositor). In all material available the body is conspicuously marked with red. Head black. Mesoscutum, and at least side of pronotum, red. Gaster varying from entirely red to red with blackened apex. Wings strongly darkened.

♀. Head in facial view moderately lengthened; from above, strongly transverse, not produced backwards behind eyes as in *malvacearum* (cf. Fig. 26). Ocelli in a low, rather wide triangle. A moderately well-defined keel between antennal insertions; in front of anterior ocellus a well-defined excavation that tends to jut forwards. Malar space a little shorter than longer diameter of the eye, 11:14. Galea considerably longer than malar space, 14:11. Antenna with 23–26 segments: 23 (1), 24(2), 25 (5), 26 (3); flagellum somewhat tapered towards apex. Thorax in profile decidedly elongate. Notaulices sharply defined. The two longitudinal keels of propodeum sharply defined; side panels polished, virtually smooth all over. Radial cell decidedly long; areolet varying from triangular to distinctly 4-sided; distal abscissa of postmarginalis hardly 0.66 times as long as proximal abscissa. Inner spur of hind tibia falling considerably short of middle of basal segment of hind tarsus; outer side of middle tibia with very variable number of teeth, 2–14; hind claw with well-defined lobe; cleft between lobe and claw proper fully half as long as claw itself. Tergite 1 a little longer than apically wide, smooth, highly polished. Ovipositor sheath very slightly longer than body.

♂. Thorax sometimes entirely black; sometimes mesoscutum red. Antenna with 23–24 segments; two preapical segments about 1.33 times longer than wide.

**MATERIAL EXAMINED**

**Bulgaria:** 4 ♂, 1 ♀, v.–vi. (Zaykov) (ZC). **Cyprus:** 21 ♂, 5 ♀, iv.–vi. (*G. Mavromoustakis*) (BMNH). **France:** 2 ♀, Basses Alpes, Digne, vi. (*Slob*) (RNH). **Greece:** 1 ♀, Corfu, Acharavi, v. (*Oogstrom*) (RNH); 1 ♀, Kerfissos, vi. (*Mavromoustakis*) (BMNH); 1 ♀, Drosia, vi. (*Mavromoustakis*) (BMNH); 1 ♀, Ilia, vii. (*Day & Else*) (BMNH); 1 ♀, 2 ♂, Thessalia, Kalambaka, vii. (*Day & Else*) (BMNH). **Turkey:** 1 ♀, Ankara, Temelli, vii. (*Guichard & Harvey*) (BMNH); 1 ♀, Nigde, Kocas, vi. (*Guichard & Harvey*) (BMNH); 10 ♂, Istanbul, Yakuplu, vi. (*Oorshot & Wiering*) (RNH). **Yugoslavia:** 1 ♀, Macedonia, Gorica, x. (*van Achterberg*) (RNH); 1 ♂ (holotype of *kolazyi*), Dalmatia, Ragusa (*Kolazy*) (ZM).

**Host.** Unknown.

**COMMENTS.** This brightly coloured species has a Mediterranean distribution. It is very like the northern *varipes* Thomson and, beyond colour, there is very little to separate the two species. Both are characterised by the form of the ante-ocellar impression and the shape of the head in facial view. Thus seen, however, the face of *varipes* is slightly wider; *varipes* also has a shorter galea.

***Agathis breviseta* Nees von Esenbeck**

(Fig. 52)

*Agathis breviseta* Nees von Esenbeck, 1814: 194. Syntypes, GERMANY (lost).

The type of *breviseta* is presumably lost. My interpretation of the species is based on that of Wesmael, the first reviser; I have examined two females (IRSNB), both bearing Wesmael's identification label but with no indication of locality.

♀, ca 3.5 mm long (excluding ovipositor). Black. Hind femur black; hind tibia blackish on apical three-fifths, with dark ring towards base.

Head in facial view considerably elongate. Malar space shorter than longer diameter of eye, 5:7. Galea dull, coriaceous, twice as long as wide. Between antennal sockets a short, knife-edged keel that projects above as a right angle before joining lowest point of deep cavity in front of anterior ocellus; this cavity deep, narrow, V-shaped. Ocelli in high triangle, the posterior tangent of front ocellus passing far in front of posterior ocelli. Antenna distinctly tapering from middle to apex, weakly bristly and with the two preapical segments about 1.33 times longer than wide; 29–30 segmented. Thorax in profile short, high. Notaulices deeply impressed. Sternaulus strongly impressed, reaching both anterior and posterior corner of mesopleurum. Lateral panels of propodeum polished. Fore-wing with areolet almost always distinctly 4-sided

(17 ex.); rarely almost triangular (4 ex.); apical abscissa of postmarginalis slightly more than 0.5 times longer than proximal abscissa. Hind femur decidedly thick, 2.5 times longer than widest part; outer side of middle tibia with 6–7 teeth; inner spur of hind tibia just reaching middle of basal segment of hind tarsus; hind claw with well-developed, somewhat pointed lobe.

Gaster rather short and broad; segment 1 markedly triangular, as long as wide apically, irregularly striate to striate-rugose all over. Ovipositor sheath short, not longer than gaster; bristle-like hairs of apical third of ovipositor sheath not, or hardly, different from those of middle third (Fig. 52).

#### MATERIAL EXAMINED

**Belgium:** 2 ♀, Wesmael coll. (IRSNB). **Bulgaria:** 23 ♀, Sh. poljana, 6–22.v.1976 (Zaykov) (ZC). **Great Britain:** 2 ♀, England, Buckinghamshire, vi–vii. (Benson) (BMNH). **Ireland:** 1 ♀, Antrim, Loch Neagh, 26.vi.1967 (Stelfox) (USNM); 1 ♂, 1 ♀, Dublin, Glenasmole, 24.vi.1938 (Stelfox) (USNM). **Turkey:** 1 ♀, Edirne, 8.v.1960 (Guichard & Harvey) (BMNH). **Yugoslavia:** 1 ♀, Slovenia, Kropa (Ward) (BMNH).

Host. Unknown.

COMMENTS. This species is fairly easy to recognise on the combination of short galea and unusually short ovipositor sheath. In his description Nees draws special attention to the latter feature.

### *Agathis assimilis* Kokujev

(Figs 2, 19, 25)

*Agathis assimilis* Kokujev, 1895: 387. Holotype ♀, U.S.S.R. (AS) [not examined].

Tobias (1963: 878) examined the type of *assimilis* which, he says, is badly damaged, lacking wings, legs (except one hind leg) and antennal tips. Specimens determined by him as *assimilis* have been received on loan at BMNH; his interpretation of Kokujev's species is accordingly accepted.

♀. Closely related to *brevisetia* on the structure of the frons (Fig. 19) and the shortness of the galea. It may be compared with that species as follows.

Colour similar. Head in facial view (Fig. 2); seen from above, slightly more transverse, less produced backwards behind eyes (Fig. 25); this is correlated with a slightly lower ocellar triangle. Antenna thinner, filiform; two apical segments relatively a little longer; 28–31-segmented; flagellum considerably more bristly. Sternaulus reaching posterior margin of mesopleurum but not anterior margin. Areolet of fore-wing variable to same degree; apical abscissa of postmarginalis slightly longer. Legs more slender; hind femur about 3 times longer than wide; segment 3 of hind tarsus relatively a little longer; outer side of middle tibia with 4–5 teeth, arranged more or less in row; inner spur of hind tibia slightly shorter, relative to length of basal segment of hind tarsus. Tergite 1 slightly narrower, more shiny because of reduction in strength of sculpture; this vaguely coriaceous, with some weak striation on basal half. Ovipositor sheath much longer, about equal to propodeum plus gaster; as in *brevisetia*, the apical, bristle-like hairs of the sheath are not differentiated from the rest.

#### MATERIAL EXAMINED

**Bulgaria, Great Britain.**

Host. Unknown.

COMMENTS. This species and *brevisetia* evidently form a small species-group characterised by the curious formation of the inter-antennal keel, combined with the deep, narrow cavity in front of the anterior ocellus. The long, filiform antenna and the longer ovipositor readily distinguish *assimilis* from *brevisetia*.

One ♀ examined (Great Britain: Scotland, The Birks, Aberfeldy, 26.vii.1954 (Stelfox) (BMNH)) has the propodeum rugulose and dull almost all over.

### *Agathis fulmeki* Fischer

(Figs 10, 35, 42, 51)

*Agathis fulmeki* Fischer, 1957b: 6. Holotype ♀, AUSTRIA (NM) [examined].

♀, ca 3.5 mm long (excluding ovipositor). Black. Apical four segments of maxillary palpus almost always yellowish and in contrast with black labial palpus. Hind femur black; hind tibia without, or virtually without, a dark basal ring.

Head in facial view short, subtriangular (Fig. 10). Longer diameter of eye 2.5 times longer than malar space. Surface between antennal insertions raised and ridge-like where it joins depression in front of



anterior ocellus; this depressed area V-shaped, not deep, slightly domed at middle. Galea smooth, shiny, 2.5 times longer than wide; labial palpus unusually long (Fig. 51). Clypeus largely polished, bare. Antenna with 25–27 segments; two preapical segments of flagellum hardly longer than wide. Thorax in profile elongate (Fig. 42), about twice as long as wide. Mesoscutum strongly shining, not densely hairy and often with vague punctuation, mostly on middle lobe. Notaulices sharply defined but not deep, distinctly foveate. Sternaulus short, shallow, sometimes almost obliterated and not reaching either posterior or anterior margin of mesopleurum. Areolet of fore-wing triangular or almost so; distal abscissa of post-marginalis hardly shorter than proximal abscissa. Legs rather thick; outer side of middle tibia with 6–7 teeth (Fig. 35); hind femur about 2.5 times longer than wide; inner spur of hind tibia just reaching middle of basal segment of hind tarsus; hind claw with conspicuous lobe, large, strongly bent and with deep cleft between itself and claw proper. Tergite 1 slightly longer than wide at apex, shiny, with faint traces of rugosity and weak indication of striation laterally. Ovipositor sheath about as long as gaster plus propodeum; seen from above, hairs of distal, slightly widened part of sheath considerably shorter and less noticeable than those proximal to it.

#### MATERIAL EXAMINED

**Austria:** 1 ♀ (holotype), Mödling-Vorderbrühl (NM). **Bulgaria:** 48 ♀, Rhodopi, vi–vii. (*Zaykov*) (ZC; 17 ♀ in BMNH).

**COMMENTS.** A most distinctive species, recognisable on combination of narrow thorax, short head and teeth on outer side of middle tibia. It differs from *breviseta* and *assimilis* in that the galea is longer and the decoration of the frons, though basically similar, has no knife-like edge between the antennal insertions.

### *Agathis rufipalpis* Nees von Esenbeck

(Figs 17, 36)

*Agathis rufipalpis* Nees von Esenbeck, 1814: 192. Syntypes, GERMANY (lost).

Wesmael (1837: 24) was the first reviser of Nees von Esenbeck's species; I have based my interpretation of *rufipalpis* on specimens in Wesmael's collection bearing his handwritten identification label.

This species is extremely like *fulmeki*, differing from it only in the following characters.

♀. Four apical segments of maxillary palpus sometimes paler than labial palpus.

Head in facial view slightly more elongate (Fig. 17). Longer diameter of eye about 1.75 times longer than malar space. Clypeus hairy all over. Depression in front of anterior ocellus more narrowly V-shaped. Antenna with 24–28 segments. Thorax in profile slightly less elongate (Fig. 36). Sternaulus equally short and weak. Outer side of middle tibia with 7–9 similarly thick teeth; inner spur of hind tibia distinctly less than half as long as basal segment of hind tarsus. Tergite 1 more distinctly sculptured and with somewhat broken striation almost all over. Ovipositor sheath about as long as gaster plus thorax.

#### MATERIAL EXAMINED

**Belgium:** 5 ♀, Brussels (1 ♀ BMNH, rest IRSNB). **Bulgaria:** 10 ♀, Rhodopi, vi.–vii. (*A. Zaykov*) (ZC). **Ireland:** 1 ♂, Wexford, Curracloe, vii. (BMNH). **Sweden:** 1 ♀, Solna, viii. 1976 (*T. Huddleston & J. Quinlan*) (BMNH).

**Host.** Unknown.

**COMMENTS.** This species is very much like *fulmeki* and the two should always be considered together. It differs from *breviseta* and *assimilis* by the same characters as those which separate these species from *fulmeki*.

### *Agathis varipes* Thomson

(Figs 16, 50)

*Agathis varipes* Thomson, 1895: 2228. LECTOTYPE ♀, SWEDEN (ZI), here designated [examined].

♂ ♀, 5.0–5.5 mm long (excluding ovipositor).

♀. Black. Gaster tending to be brownish. Hind femur varying from mostly black to entirely brownish red (1 ♀, Italy).

Head in facial view subtriangular (Fig. 16). Impression in front of anterior ocellus variable in definition; sometimes sharply U-shaped and jutting forwards as though on a prominence; sometimes showing merely as a U-shaped, margined depression (in the related *tibialis*, this depression tends to be V-shaped). Ocelli in a rather low triangle. Malar space 0.66 times as long as longer diameter of eye. Galea rather short, shorter

than in related *tibialis*, 2.25–2.33 times longer than wide, not longer than malar space. Antenna with 23–26 segments: 23(2), 24(5), 25(1), 26(1). Thorax in profile somewhat elongate, fully 1.5 times longer than wide seen in profile. Notaulices somewhat variable in definition; in one bred male (Surrey, Effingham), they are hardly indicated. Sternaulus usually not reaching posterior corner of mesopleurum. Medial, longitudinal keels of propodeum sharply defined; lateral panels extensively polished. Areolet of fore wing usually sharply triangular; radial cell rather long (Fig. 50); distal abscissa of postmarginal is usually distinctly more than half as long as proximal abscissa. Outer side of middle tibia with 2–5 teeth arranged more or less in a row; hind claw with strong, well-defined lobe; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus. Gaster on the whole having a smooth, highly polished appearance. Basal half of tergite 1 sometimes with indication of weak rugosity. No trace of sculpture posterior to the hardly indicated basal swelling on tergites 2+3. Ovipositor sheath about as long as body.

♂. Two preapical segments of antenna fully 1.5 times longer than wide; whole antenna considerably longer than in *tibialis*. Hind femur much less thickened (cf. Fig. 33), infusate but sometimes reddish towards apex.

#### MATERIAL EXAMINED

**Germany:** 2 ♀, 2 ♂, no locality, ex *Metzneria lappella* (L.) (BMNH); 1 ♀, Goslar, Grauhöfer, 10.viii.1944 (Bauer) (EH). **Great Britain:** 1 ♀, Devon, E. Bovey, viii (Perkins) (BMNH); 2 ♀, 1 ♂, Hampshire, Farley Mount, vi–vii., ex *Myelois cirrigerella* (Zincken) (Fassnidge) (BMNH); 1 ♀, Hertfordshire, Tring, vii (Benson) (BMNH); 1 ♀, Kent, Erith, swept from *Achillea* (Ford) (BMNH); 1 ♂, Cambridgeshire, Wicken Fen, 9.vii.1982, ex microlepidopteron collected 16.iv.1982 on *Salix* (Pitkin) (BMNH); 2 ♀, 2 ♂, Surrey, Coulsdon, vii.1944, ex stems of *Arctium medium* (*Arctium ?lappa* L.) collected iii.1944 (Britten) (BMNH); 1 ♀, 3 ♂, Surrey, Effingham Common, vii.1946, ex *Metzneria lappella* (L.) collected iii.1946 (Niblett) (BMNH); 1 ♀, Surrey, Oxshott, vi. (Billups) (BMNH). **Sweden:** 1 ♀ (lectotype), Skåne, 'Fg' (= Fogelsang) (Thomson) (ZI); 1 ♀, Ringsjö (Perkins) (BMNH).

**Hosts.** *Metzneria lappella* (L.) (Gelechiidae). *Myelois cirrigerella* (Zincken) (Pyrilidae).

**COMMENTS.** This species and *tibialis* are very much alike, the only reliable difference being the shape of the antero-ocellar impression and the thickness of the hind tibia. *A. varipes* is slightly larger than *tibialis* but this may have little significance in the identification of single specimens. There is some overlap in the number of antennal segments.

### *Agathis anglica* Marshall

(Figs 18, 49)

*Agathis anglica* Marshall, 1885: 265. Holotype ♀, GREAT BRITAIN (BMNH) [examined].

*Agathis albanica* Fischer, 1957b: 3. Holotype ♀, ALBANIA (NM) [examined]. **Syn. n.**

♂ ♀, 4.5–5.0 mm long (excluding ovipositor).

♀. Black. Hind femur entirely black; hind tibia yellowish on basal two-thirds, with dark basal band and blackened on apical two-fifths. Medius of fore-wing usually colourless throughout.

Head in facial view markedly elongate and considerably narrowed below eyes (Fig. 18); seen from above with face just out of view strongly transverse. Hardly a trace of a keel between antennal sockets and with at most a weakly impressed dimple in front of anterior ocellus. Malar space almost equal to longer diameter of eye, 13:15. Galea about 3.5 times longer than wide and about 1.5 times longer than malar space. Antenna with 26–29 segments, slightly tapered towards apex and with segment 4 from apex about 1.25 times longer than wide. Thorax in profile somewhat short and high. Notaulices deeply impressed. Propodeum with the usual two longitudinal keels and with polished, lateral panels. Sternaulus well defined, reaching posterior corner of mesopleurum. Radial cell short, broad (Fig. 49); areolet markedly, characteristically 4-sided; distal abscissa of postmarginalis very short, 1.25–1.33 times as long as proximal abscissa. Outer side of middle tibia with 3–5 teeth arranged in a row; hind claw with at most a weakly angled projection at base. Tergite 1 rugose-striate all over. Tergites 2+3 with well-defined, transverse, basal, blister-like swelling; surface posterior to this swelling with a considerable amount of striation or rugose-striation. Ovipositor sheath nearly as long as body.

♂. Like female except for sexual differences. In nine examples from Turkey there is considerable variation in the definition of the impression in front of the anterior ocellus; sometimes it is relatively distinct; sometimes virtually absent; in all these examples the areolet of the fore-wing is very obviously 4-sided. Tergites 2+3 show much less rugosity than in the female and are sometimes virtually smooth.

## MATERIAL EXAMINED

**Albania:** 1 ♀ (holotype of *albanica*), Kula Ljums (NM). **Austria:** 1 ♀, Achenkirch (*Haeselbarth*) (EH); 1 ♀, Fliess (*Haeselbarth*) (EH); 1 ♀, Nordkette, 3.vii.1947, ex *Epinotia mercuriana* (Frölich) (*Bauer*) (EH). **Bulgaria:** 1 ♀, Rhodopi, Aida, 5.vi.1976 (*Zaykov*) (ZC); 1 ♀, Popsko, 21.vi.1977 (*Zaykov*) (ZC); 1 ♀, Sh. poljana, 18.vi.1976 (*Zaykov*) (ZC); 1 ♀, Bojuo, 24.vii.1975 (*Zaykov*) (ZC). **Cyprus:** 27 ♀, Mavromoustakis coll. (BMNH); 1 ♀, Platres, 16.vi.1970 (*Gallagher*) (BMNH). **Great Britain:** 1 ♀ (holotype of *anglica*), Wales, Pembrokeshire, Milford Haven (BMNH); 1 ♀, England, Surrey, Hackhurst Downs, 28.viii.1982 (*Allen*) (AA). **Greece:** 1 ♀, 2 ♂, Rhodes, Ixia (*Day*) (BMNH). **Italy:** 1 ♀, Partschins, vii.1966 (*Haeselbarth*) (EH).

HOST. *Epinotia mercuriana* (Frölich) (Tortricidae).

COMMENTS. It is possible that the range of specific variation accepted here for *anglica* may be too wide and the material examined may form an aggregate. Nevertheless, all the specimens provisionally accepted as *anglica* have four rather striking features in common: the narrow head as seen from in front, the conspicuously 4-sided areolet of the fore-wing, the unlobed claws and the rugosity of the gaster.

*Agathis tibialis* Nees von Esenbeck

(Figs 33, 48, 53)

*Agathis tibialis* Nees von Esenbeck, 1814: 194. Syntypes, FRANCE (lost).

♂ ♀, ca 4 mm long (excluding ovipositor).

♀. Black with gaster usually brownish, especially tergites 2+3. Hind femur almost always bright brownish red but becoming flushed with darker colouring on basal half. Wings strongly darkened; medius of fore wing heavily brown throughout.

Head in facial view, short, subtriangular. Impression in front of anterior ocellus narrow, well defined and, when head seen in profile, not projecting beyond anterior ocellus; this elongate, margined impression united in front with sharp, strongly raised keel between antennal insertions. Galea nearly 3 times as long as wide, shining, polished, distinctly a little longer than malar space. Malar space shorter than longer diameter of eye. Antenna characteristically short, 21–22-segmented: 21 (8), 22 (3); four preapical segments of antenna only slightly longer than wide. Thorax in profile somewhat elongate, less than twice as long as wide, 20:13. Notaulices well defined. Sternaulus becoming somewhat indistinct before reaching posterior margin of mesopleurum. Propodeum highly polished on each side of the two longitudinal keels. Radial cell rather short, 5 times as long as wide; areolet of fore wing triangular to subtriangular, never obviously 4-sided; distal abscissa of postmarginalis fully 0.66 times as long as proximal abscissa; medius of fore-wing heavily sclerotised throughout. Hind femur much swollen (Fig. 33); inner spur of hind tibia much less than half as long as basal segment of hind tarsus (Fig. 53); hind claw with conspicuous lobe. Tergite 1 polished and virtually smooth over most of apical half; vaguely rugose-striate on posterior half; sometimes faint scaly-reticulation present on apical, polished surface. Rest of gaster highly polished and shining. Ovipositor distinctly a little longer than body.

♂. Like female in having thickened, predominantly reddish hind femur. Antenna characteristically shorter than body, 21–23-segmented: 21 (6), 22 (7), 23 (1); two preapical segments about 1.33 times as long as wide.

## MATERIAL EXAMINED

**Great Britain:** 13 ♀, 28 ♂, Devon, Dawlish Warren (*Allen*) (AA); 1 ♀, Devon, Braunton Burrows, vii (*Allen*) (AA); 1 ♀, Devon, Heathfield, viii (*Allen*) (AA); 1 ♀, Dorset, Portland, collected from seed-head of *Centaurea nigra* L. (*Hall*) (BMNH); 2 ♀, Cambridgeshire, Wicken Fen, ex seed-head of *Pulicaria dysenterica* L., collected 29.xiii.1975, emerged 1976 (host either *Apodia bifractella* Douglas or *Ptocheuusa paupella* Zeller) (*Emmet*) (BMNH); 4 ♀, 3 ♂, Surrey, Banstead, ex *Aristotelia bifractella* Douglas in flower-heads of *Inula squarrosa* L., collected ix.1946, emerged viii.1947 (*Niblett*) (BMNH); 25 ♀, 25 ♂, Surrey, Salfords, viii (*Allen*) (AA); 4 ♀, 21 ♂, Sussex, Hailsham (*Ford*) (BMNH). **Holland:** 1 ♀, Terschelling, near Rijsplak, 14.vii.1967 (*Pronk*) (RNH); 2 ♀, Terschelling, dunes near Doodemauskisten, 6.vii.1967 (*Pronk*) (RNH).

HOSTS. *Apodia bifractella* (Duponchel) (Gelechiidae) and possibly *Ptocheuusa paupella* (Zeller) (Gelechiidae), both feeding in flower-heads of *Pulicaria dysenterica* L.

COMMENTS. The data indicate that this species flies from July to September, but mainly in August, and apparently is not uncommon where it occurs. What characterises the species essentially are the much



thickened, red-flushed hind femur, the short antenna in both sexes, the narrow, rather low, margined impression in front of the anterior ocellus, and the sharp interantennal keel.

*Agathis malvacearum* Latreille

(Figs 4, 26)

*Agathis malvacearum* Latreille, 1805: 175. Holotype ♀, FRANCE (lost).

♂, ♀, 5–7 mm long (excluding ovipositor).

♀. Black with tergites 1 and 2+3 largely bright yellowish red. Hind femur reddish yellow; middle and front femora reddish yellow but touched with black at base.

Head in facial view strongly elongate (Fig. 4), eyes strongly bulging; seen from above, strongly produced backwards behind eyes (Fig. 26). In profile a conspicuous bulge in region of temples. Malar space very slightly shorter than longer diameter of eye, 16:17. Galea about 2.25 times longer than wide, distinctly a little longer than malar space. Antenna with 21–32 segments. Between antennal insertions a fairly sharp keel that unites above with a deep U-shaped cavity in front of anterior ocellus. Thorax of ordinary form. Notaulices deeply impressed. Sternaulus strongly defined, reaching posterior corner of mesopleurum. Side of pronotum anterior to oblique trough polished and with hardly a trace of sculpture. Radial cell rather long; areolet distinctly 4-sided in material available; distal abscissa of postmarginalis slightly more than 0.5 times as long as proximal abscissa. Outer side of middle tibia with 2–5 teeth arranged more or less in a row; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus; hind claw with dentiform, basal lobe; cleft between lobe and claw proper not particularly deep. Tergite 1 becoming smooth, polished on about apical one-third; elsewhere with fairly distinct striation. Tergites 2+3 polished, unsculptured. Ovipositor sheath about as long as body.

♂. Like female in having tergites 2+3 brightly coloured; a single example from Corsica (BMNH) has the mesoscutum as brightly reddish as the base of the gaster but each of the three lobes is suffused with infuscation; a single male from Bulgaria, Rhodopi, (ZC) has the mesoscutum entirely reddish.

MATERIAL EXAMINED

**Bulgaria:** 1 ♀, Rhodopi, Petelovo, vii (Zaykov) (ZC). **France:** 1 ♂, Basses Alpes, Digne, vi. (Slob) (RNH); 2 ♂, 2 ♀, Bretagne, Pres'île de Rhuy, Kerfontaine, 1976, on *Malva* sp. (Doesberg) (RNH); 1 ♂, Corsica, vii. (BMNH). **Greece:** 1 ♀, Drosia, 4.vi.1957 (Mavromoustakis) (BMNH); 1 ♀, Korfissos, 8.vi.1957 (Mavromoustakis) (BMNH); 1 ♀, Epidavros, vi. (Mound) (BMNH). **Turkey:** 1 ♀, Mersin, Servatul Gecidi (Guichard & Harvey) (BMNH).

HOST. *Pexicopia malvella* (Hübner) (Gelechiidae).

COMMENTS. Tobias (1964) emphasises the colour variability of this species on the basis of series bred from the Mallow moth in Armenia. He points out that autumnal specimens are darkest in colour while summer forms emerging in August and September are lighter with tergites 1–3 red and the hind femur also reddened. He also considers (1963: 876) that darker examples of *malvacearum* agree with the original description of *tibialis* Nees von Esenbeck as well as with the interpretation of this latter species accepted by earlier authors. He accordingly suggests that *tibialis* Nees von Esenbeck may be a synonym of *malvacearum* Latreille. But in the absence of formal synonymisation I prefer to use the name '*tibialis* Nees von Esenbeck' for a species that agrees better with Nees von Esenbeck's original description than any variety of *malvacearum*.

The bulging temples of *malvacearum* are its most characteristic feature and the head in consequence appears strongly produced backwards behind the eyes when seen from above.

*Agathis griseifrons* Thomson

(Fig. 44)

*Agathis griseifrons* Thomson, 1895: 2227. LECTOTYPE ♀, SWEDEN: (ZI), here designated [examined].

*Agathis laticarpa* Telenga, 1955: 255. Holotype ♀, U.S.S.R.: Ukraine, Chernogavskaya Oblast (AS) [not examined]. **Syn. n.**

♂ ♀, 4.8–5.5 mm long (excluding ovipositor). Black. Legs predominantly reddish but colour variable; hind femur often entirely reddish but sometimes darkened on basal half, more rarely with infuscation extending along whole of upper surface; hind tibia often markedly yellowish, infuscate on about apical third, with a darkened basal ring.

♀. Head in facial view obviously elongate. Malar space fully two-thirds as long as longer diameter of eye,

11: 15. Galea as long as malar space. Face densely clothed with greyish or pale brownish pubescence. No trace of a keel between antennal insertions and virtually no impression in front of anterior ocellus. Antenna with 31–33 segments: 31 (1), 32 (8), 33 (3); flagellum rather finely tapered towards apex. Thorax in profile short and of generalised appearance. Side of pronotum anterior to the oblique trough usually very coarsely rugose. Notaulices deeply impressed. Sternaulus strongly developed, reaching posterior corner of mesopleurum. Areolet of fore-wing distinctly 4-sided; distal abscissa of postmarginalis about 0.33 as long as proximal abscissa. Hind claw with pale, dentiform lobe at base (Fig. 44); outer side of middle tibia with 1–3 teeth arranged in a row. Gaster of ordinary form. Tergite 1 about as long as apically wide, striate-rugose all over. Frequently a certain amount of striation to side of, and apical to, transverse, blister-like, posterior swelling. Ovipositor sheath about as long as gaster plus thorax.

♂. Like female except for sexual differences. Antenna very long, tapered apically, 29–32-segmented; segment 8 from apex twice as long as wide. Usually more brightly coloured than female with apical four segments of maxillary palpus entirely yellowish. Tooth at base of hind claw often hardly developed.

#### MATERIAL EXAMINED

**Bulgaria:** 1 ♀, Rhodopi, Gabrovo, viii. (Zaykov) (ZC). **France:** 1 ♂, Beaune, ex *Pyrausta aurata* Scopoli on *Mentha aquatica* L. (BMNH); 1 ♀, Nantua, Marshall coll. (BMNH). **Great Britain:** 1 ♀, 1 ♂, Kent, Bexley, bred viii.1952 ex *Pyrausta aurata* Scopoli (Ford) (BMNH); 3 ♀, Surrey, Bletchworth, 23.viii.1983 (Allen) (AA); 1 ♀, Clandon Downs, vi. (Perkins) (BMNH); 1 ♂, 1 ♀, Boxhill, vi. (Perkins) (BMNH). **Greece:** 1 ♀, Philippi, v. (Guichard & Harvey) (BMNH). **Holland:** 1 ♀, Maastricht, vi. (Lefebvre) (RNH); 2 ♀, Asperen, vi.–viii. (Zwakhals) (RNH). **Ireland:** 1 ♂, 1 ♀, Woodbrock, vi. (Stelfox) (USNM); 1 ♀, Wicklow, Athdown, vii. (Stelfox) (USNM). **Italy:** 2 ♂, 1 ♀, Naples, viii. (Osborne) (BMNH). **Poland:** 2 ♀, Tatra Mts, Zakopane, vi. (Aubertin) (BMNH). **Sweden:** 6 ♀, Skåne, 'sand-dunes' (ZI); 1 ♀ (lectotype), Skåne, labelled 'griseifrons' and 'coll. L-gh' (ZI).

Host. *Pyrausta aurata* (Scopoli) (Pylalidae).

COMMENTS. In one of the two females from Holland, Asperen, tergite 1 is almost smooth over most of the apical half, and the dark ring at the base of the hind tibia is joined to the infusate area at the apex of the tibia by a broad band of infuscation.

*Agathis griseifrons* is largely characterised by the absence of a keel between the antennal insertions, the virtual absence of any impression in front of the anterior ocellus, the dense pubescence of the face and the usually predominantly red-marked hind femur. Having a rugose first tergite, it is at once different from the superficially similar *tibialis* and *varipes*.

### *Agathis nigra* Nees von Esenbeck

(Figs 11, 38, 45)

*Agathis nigra* Nees von Esenbeck, 1814: 191. Syntypes, GERMANY (lost).

*Agathis testaceipes* Fischer, 1957b: 8. Holotype ♀, AUSTRIA (NM) [examined]. **Syn. n.**

Wesmael (1837: 23) was the first reviser of Nees von Esenbeck's species; I have based my interpretation of *nigra* on specimens in Wesmael's collection bearing his handwritten identification label.

♂ ♀, 4.5–4.8 mm (excluding ovipositor). Black, rarely tergites 2+3 reddish (1 ♀, Yugoslavia). Hind femur reddish but flushed with infuscation on basal half; almost entirely reddish in 2 ♀ from Yugoslavia.

♀. Head in facial view not strongly elongate (Fig. 11). Malar space distinctly shorter than longer diameter of eye, 9:13. A weak or vestigial keel between antennal insertions. A more or less distinct V-shaped impression in front of anterior ocellus. Mouth parts very long; when fully extruded distinctly longer than head; galea fully 4 times as long as wide, tapering to a fine point. Antenna 23–25-segmented: 23 (4), 24(2), 25 (4); two preapical segments about 1.33 times longer than wide. Thorax in profile markedly elongate (Fig. 38). Mesoscutum having a black, shiny appearance owing to sparseness of pubescence. Notaulices varying much in definition but usually weakly defined, at least anteriorly; virtually absent in 1 ♀ (Yugoslavia, Korab Mts); frequently obliterated in posterior half in other females. Sternaulus usually reaching posterior corner of mesopleurum, rarely fading out before this. Propodeum showing a slight peculiarity in that each lateral panel shows on its dorsal surface a broad, transverse band of very coarse rugosities. Areolet of fore-wing always very obviously triangular; in two females even with short stalk; distal abscissa of postmarginalis almost as long as proximal abscissa. Inner spur of hind tibia falling far short of middle of basal segment of hind tarsus; outer side of middle tibia with 1–3 teeth arranged more or less in a row; in one female without teeth; hind claw with at most a small projection at base (Fig. 45). Gaster highly polished; tergite 1 virtually without trace of sculpture. Ovipositor sheath about as long as body.



♂. Like female except for sexual differences. Antenna with 23–24 segments; flagellum very thin, thread-like, the two preapical segments almost twice as long as wide.

#### MATERIAL EXAMINED

**Austria:** 1 ♀ (holotype of *testaceipes*), Burgenland, Schützen, 10.vii.1941 (*Fulmek*) (NM). **Belgium:** 7 ♀, 6 ♂, viii. (*Crevecoeur*) (IRSNB); 1 ♂, Brussels, Wesmael coll. (IRSNB). **Germany:** 1 ♀, Mecklenburg (*Konow*) (BMNH). **Yugoslavia:** 1 ♀, Korab Mts, Stirovica, viii. (*Martino*) (BMNH); 1 ♀, Nicpur, vii. (*Martino*) (BMNH).

Host. Unknown.

COMMENTS. This is one of the more distinct species, largely characterised by the much lengthened galea, absence of lobe on hind claw and especially by the almost obliterated notaulices. The two other species with long galea included in this revision are *taurica* and *zaykovi*, but both can easily be separated from *nigra*.

A single female from Spain: Navarra, Peralta (*Achterberg*) (RNH) may possibly represent a further species. In all important respects it resembles *nigra* – short head and absence of lobe on hind claw – but the galea is longer, nearer to six times longer than basal width, and the notaulices are sharply defined. I have labelled this specimen as ‘? *nigra* Nees or sp. n.’.

### *Agathis zaykovi* sp. n.

(Figs 7, 34, 47)

♂ ♀, ca 4 mm (excluding ovipositor). Black. Hind femur black throughout.

♀. Head in facial view considerably lengthened (Fig. 7). Malar space 0.66 times as long as longer diameter of eye. Between antennal insertions virtually no trace of a keel. A weak, vague V-shaped impression, sometimes almost obliterated, in front of anterior ocellus. Galea tapered towards apex but not so evenly as in *nigra*, about 3.5 times longer than its basal width (Fig. 34). Antenna with 26–27 segments; 26 (8), 27 (4); apical 5–6 segments of flagellum somewhat tapered; two preapical segments hardly longer than wide. Thorax in profile somewhat elongate but less so than in *nigra* (cf. Fig. 38). Notaulices costate, deeply impressed throughout. Sternaulus strongly defined, costate throughout and reaching posterior corner of mesopleurum. Areolet of fore-wing usually slightly narrowed above but always distinctly 4-sided; distal abscissa of postmarginalis hardly shorter than proximal abscissa. Hind claw with large lobe (Fig. 47); outer side of middle tibia with 6–9 teeth, some of them paired, and forming an irregular row; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus. Gaster of generalised form and broader than in *nigra* (Fig. 40). Tergite 1 with vague traces of rugosity across brow, lacking the highly polished appearance of *nigra*. Ovipositor sheath as long as gaster plus thorax.

♂. Antenna almost as long as that of *nigra* from which it is distinguished by the structure of the claws.

#### MATERIAL EXAMINED

Holotype ♀, **Bulgaria:** Rhodopi, Theigovsharu, 9.viii.1979 (*A. Zaykov*) (ZC).

Paratypes. 12 ♀, same data (ZC; 4 in BMNH).

Non-paratypic material **Bulgaria:** 3 ♂, Rhodopi, Theigovsharu, 9.viii.1979; 3 ♂, Stointe, 4.viii.1978 (*A. Zaykov*) (ZC). **Greece:** 6 ♀, 8 ♂, Macedonia, Korab Mts, Stirovica, 27.vii.–3.viii. (*V. Martino*) (BMNH).

Host. Unknown.

COMMENTS. The length of the galea together with the relatively large number of teeth on the outer side of the middle tibia make *zaykovi* distinct from all other included species that have a generalised gastral shape. The strongly lobed claws at once separate it from *nigra* to which it may not be closely related in spite of the lengthened galea.

### *Agathis taurica* Telenga

*Agathis taurica* Telenga, 1955: 260. Lectotype ♀, U.S.S.R. (AS) designated by Tobias [not examined].

My interpretation of this species is based on a paralectotype ♂ received on loan from AS. I have been unable to discover where, or indeed whether, the lectotype designation was published.

♀, 5 mm (excluding ovipositor). Like *zaykovi* in having hind claw with strong lobe though this is slightly less well developed than in *zaykovi*; *taurica* may be compared with *zaykovi* as follows.

Antenna with 25 segments (Telenga gives 24 segments for the female). Head in facial view like *zaykovi* (cf. Fig. 7). Mouth-parts longer; galea tapering to fine point, six times as long as basally wide. Head from above slightly less transverse and less emarginate behind. Thorax in profile slightly less elongate.



Notaulices deeply impressed but smooth throughout. Virtually no trace of a sternaulus. Areolet of fore-wing distinctly 4-sided but slightly narrower; distal abscissa of postmarginalis slightly shorter in relation to proximal abscissa. Outer side of middle tibia with broad band of close, densely placed teeth, about 23 (only 1 ex.!); inner spur of hind tibia about 0.33 times as long as basal segment of hind tarsus. Gaster a little longer and narrower. Tergite 1 a little longer than its apical width, shining and with vague traces of sculpture across brow. Ovipositor sheath about as long as gaster plus thorax.

#### MATERIAL EXAMINED

**Turkey:** 1 ♀, Amasya, 1400 ft, 6.vi.1959 (*Guichard*) (BMNH). **U.S.S.R.:** 1 ♂ (paralectotype), Tauria, Simferopol (*Pliginskij*) (AS).

Host. Unknown.

COMMENTS. As far as is known this species is not part of the main European fauna and has an eastern Mediterranean distribution. Among the species under review it is the third with greatly lengthened mouth-parts. It is distinct from the other two species—*nigra* and *zaykovi*—with much lengthened galea (and indeed from all other included species) on the dense band of teeth on the outer side of the middle tibia. Telenga (1955) records *taurica* from Simferapol and Sevastopol; Tobias (1976) records it from the Crimea and Armenia.

### *Agathis semiaciculata* Ivanov

(Figs 13, 43)

*Agathis semiaciculata* Ivanov, 1899: 364. Syntypes, U.S.S.R. (lost).

♂ ♀, 4.5–5.5 mm (excluding ovipositor). Black. Hind femur black throughout; middle and front femora blackish on at least basal half.

♀. Head in facial view only moderately elongate (Fig. 13). Malar space very slightly shorter than longer diameter of eye, 13:15. Galea rather short, distinctly shorter than malar space, slightly more than 2.5 times longer than wide. Antenna thin, of even thickness throughout, 26–28-segmented: 26(2), 27(1), 28(1). Face almost as thickly pubescent as in *griseifrons* and in two out of four females with distinct traces of striate-punctuation. Virtually no keel between antennal insertions and no depression in front of anterior ocellus. Thorax in profile of generalised shape. Notaulices deeply impressed. Side of pronotum anterior to oblique trough as coarsely rugose as in *griseifrons*. Sternaulus strongly developed, reaching posterior corner of mesopleurum. Areolet of fore-wing a little narrowed above but distinctly 4-sided; distal abscissa of postmarginalis hardly half as long as proximal abscissa. Propodeum with the usual, two longitudinal keels, sometimes obscured by surrounding rugosities. Outer side of middle tibia with 1–2 teeth, difficult to see because of infuscation of tibia; hind claw with small tooth at base but no deep cleft between it and claw proper (Fig. 43); hind claws longer and more powerfully built than in *griseifrons*; inner spur of hind tibia well developed, two-fifths as long as basal segment of hind tarsus. Tergite 1 hardly longer than its apical width, closely, evenly striate all over; striation tending to be broken and confused at middle of segment. Basal half of tergites 2+3 closely striate all over, the striation tending to be concentric around basal, transverse swelling. Ovipositor sheath almost as long as body.

♂. Like female except for sexual characters. Antenna with 26–28 segments: 26(1), 27(2), 28(2). Definition of basal tooth of hind claw variable; sometimes represented by a mere projection or angulation. Sculpture of basal half of tergites 2+3 tending to be broken down to intricate rugose-striation.

#### MATERIAL EXAMINED

**Italy:** 1 ♀, Bolzano, Seiser-Alm., 1900 m, 24.vi.1976 (*Zwakhals*) (RNH). **Switzerland:** 2 ♂, 3 ♀, Arolla, 7000–8000 ft, 29–30.vi.1935 (*Benson*) (BMNH); 1 ♀, Valais, Les Haudères, vi.1935 (*Benson*) (BMNH); 1 ♂, 1 ♀, Müstairtal, 2400 ft, vi.–vii.1960 (*Benson*) (BMNH); 1 ♂, 1 ♀, Saas-Fee, 7000–8000 ft, 25.vi.1962 (*Benson*) (BMNH).

Host. Unknown.

COMMENTS. This species has a fairly close affinity with *griseifrons* from which it can at once be separated on the sculpture of the gaster. On the basis of the available material, it seems to be an alpine species. According to Telenga (1955) it is wide-spread in south-western regions of the U.S.S.R. with a range extending to northern Mongolia.

No other species in this revision has such extensive sculpture on tergites 2+3 though there is sometimes a weak approach to this condition in *anglica*. The head in facial view is hardly different from that of *griseifrons* though slightly wider towards the mouth; also, *griseifrons* has a distinctly tapered flagellum.

*Agathis polita* sp. n.

(Figs 8, 23)

♀, 4–5 mm (excluding ovipositor). Black with no trace of paler colouring on gaster. Wings almost hyaline.

Head in facial view markedly elongate and considerably constricted beneath eyes (Fig. 8); seen from above, considerably prolonged backwards behind eyes (Fig. 23). A sharp keel between antennal insertions unites above with a fairly distinct, V-shaped cavity in front of anterior ocellus. Antenna long, thin with 26–27 segments. Galea rather broad, not tapered to apex and distinctly a little longer than malar space, 5:4, and 2.5 times longer than wide. Thorax in profile markedly elongate. Notaulices at first sight wanting, indicated by barely visible, linear impressions. Sternaulus represented by short, hardly impressed line. Propodeum appearing highly polished, its twin keels virtually obliterated. Areolet of forewing triangular in holotype, distinctly 4-sided in paratype; distal abscissa of postmarginalis hardly shorter than proximal abscissa. Outer side of middle tibia with 8–9 irregularly spaced teeth; inner spur of hind tibia much less than half as long as basal segment of hind tarsus; hind claw with prominent lobe. Gaster decidedly narrow. Tergite 1 about 1.33 times longer than apically wide, smooth, polished. Ovipositor sheath a little shorter than head plus thorax.

## MATERIAL EXAMINED

Holotype ♀, **Jordan**: Zerkatal, b. Romana, 200 m, 11.iv.1959 (*J. Klapperich*) (HNHM).

Paratype. 1 ♀, same data (BMNH).

Host. Unknown.

COMMENTS. This is an extra-limital species and strictly has no place in this revision. It is included, however, because being virtually without notaulices it allows the following species, *persephone*, to be defined with more accuracy.

*Agathis persephone* sp. n.

♂ ♀, 5.5–6.0 mm (excluding ovipositor). Black with no hint of paler colouring on gaster. Hind femur black.

♀. Head in facial view short, subtriangular; from above, hardly distinguishable from that of *polita* (cf. Fig. 23). Keel between antennal insertions weak to almost absent. In front of anterior ocellus a fairly well-defined, somewhat projecting, V-shaped cavity. Galea rather short, twice as long as wide, hardly as long as malar space, 10:11. Antenna long, somewhat tapered towards apex, 25-segmented. Thorax in profile considerably elongate, almost twice as long as wide, 9:5. Mesoscutum without trace of notaulices. Mesopleurum with very short, weak sternaulus, separated from posterior corner of mesopleurum by fully its own length. Areolet of fore-wing triangular, with distinct basal stalk (1 ex.!). Distal abscissa of postmarginalis fully 0.66 times as long as proximal abscissa. Outer side of middle tibia with 4 teeth, the two apical ones not easy to see because of infuscation of tibia; inner spur of hind tibia much less than half as long as basal segment of hind tarsus; hind claw with pale, angular projection rather than lobe. Side panels of propodeum in far greater part smooth, polished. Gaster beyond tergite 1 decidedly long, narrow; tergite 1 slightly longer than apically wide with vague rugosity towards sides but virtually smooth across apical third. Ovipositor sheath fully as long as body.

♂. Like female but head, seen from above, slightly more produced backwards behind eyes. Antenna 26–27-segmented. Sternaulus absent in one example, hardly indicated in the other. Areolet of fore-wing triangular.

## MATERIAL EXAMINED

Holotype ♀, **France**: Aspin, 680 m, 5.vii.1951 (*H. Teunissen*) (RNH).

Paratypes. **France**: 1 ♂, Dordogne, Sarlat, 4.vi.1975 (*D. C. Geijsked*) (RNH); 1 ♂, Figeac, vi.1977 (*H. Teunissen*) (BMNH).

Host. Unknown.

COMMENTS. This species is distinct because it lacks notaulices. The short head, in facial view, together with the ornamentation of the frons, suggests a probable relationship with *varipes*.

*Agathis ariadne* sp. n.

(Fig. 1)

♂ ♀, ca 4.5 mm (excluding ovipositor). Black. Gaster with no trace of red colour on tergites 2+3.

Mandibles deep yellow; in the single female (holotype) labrum also deep yellow. Except for weak, basal infuscation, hind femur bright reddish yellow in holotype and two out of three males.

♀. Head in facial view moderately elongate, wide across clypeus (Fig. 1), appearing very black and shiny, especially across clypeus owing to sparsity of pubescence. A well-defined keel between antennal insertions and a fairly deep, V-shaped impression in front of anterior ocellus. Galea about 3 times as long as its basal width and 1.5 times longer than malar space. Antenna thin, rather short, not tapering towards apex, 26-segmented. Thorax in profile somewhat elongate. Notaulices well defined. Sternaulus short, deep, not reaching posterior corner of mesopleurum. Side panels of propodeum polished except towards antero-lateral corner. Areolet of fore-wing almost triangular; distal abscissa of postmarginalis about 0.5 times as long as proximal abscissa; radial cell rather long, much as in *varipes* (cf. Fig. 50). Outer side of middle tibia with 5 teeth arranged more or less in row; inner spur of hind tibia reaching virtually middle of basal segment of hind tarsus; hind claw with strong lobe. Gaster of generalised form. Tergite 1 only slightly longer than its apical width and with only a very weak indication of sculpture. Ovipositor sheath about as long as gaster plus propodeum; hairs of sheath very bristly, those in apical fifth hardly different from those proximal to it.

♂. Like female except for sexual differences. Antenna with 23–24 segments, long, rather thin. In one male, tergite 6 is fully extruded and shows at base a specialised area (? sex gland), from which arise two pencils of hairs.

#### MATERIAL EXAMINED

Holotype ♀, **Czechoslovakia**: Szlovák, Erchs, Selmecbánya, 600 m, 22.vii.1976 (*J. Papp*) (HNHM).

Paratypes. 3 ♂, same data (HNHM, one in BMNH).

Host. Unknown.

COMMENTS. This species certainly has some affinity with *varipes* but differs in the ornamentation of the frons and in having face much widened below. The virtually undifferentiated bristles towards the apex of the ovipositor sheath provide an additional, useful character for the recognition of *ariadne*.

The existence of what could be a sex gland at the base of the 6th tergite in the male needs to be investigated in detail; no similar structure is apparent in any of the males of *varipes*.

### *Agathis anchisiades* sp. n.

(Figs 6, 22)

♀, ca 4.5 mm long (excluding ovipositor). Black. Gaster with no hint of paler colouring on tergites 2+3. Hind femur blackish with a small suffusion of paler colouring at extreme apex; hind tibia obscurely reddish yellow, infuscate in apical two-fifths and virtually with no trace of a darkened prebasal ring.

Head in facial view characteristically elongate (Fig. 6); from above rather strongly produced backwards behind the rather large eyes (Fig. 22). A sharp keel between antennal insertions and a distinct, narrow, V-shaped cavity in front of anterior ocellus. Antenna long, tapering, 29-segmented. Galea a little shorter than malar space, slightly more than 2.5 times longer than wide. Malar space two-thirds as long as longer diameter of eye. Thorax in profile rather short, of generalised form. Notaulices well defined but not sharply costate. Sternaulus sharply defined, reaching posterior corner of mesopleurum. Dorsal surface of side panels of propodeum showing much intricate rugosity. Areolet of fore-wing almost triangular; distal abscissa of postmarginalis almost as long as proximal abscissa. Segments 3–4 of middle tarsus very short, 4 being not longer than wide; segment 4 of hind tarsus about 1.33 times longer than wide; inner spur of hind tibia reaching middle of basal segment of hind tarsus; this spur is margined with a particularly distinct row of short bristles on its inner side; hind claw with strong lobe and deep cleft between lobe and claw proper; outer side of middle tibia with 7 thick teeth, very irregularly spaced. Gaster of generalised form. Tergite 1 about as long as its apical width, markedly triangular, striate all over. Ovipositor sheath about as long as propodeum plus gaster and, seen from above, as bristly at apex as at middle.

#### MATERIAL EXAMINED

Holotype ♀, **Hungary**: Hortobágy, Zam, 2–23.v.1975 (*Kaszab*) (HNHM).

Host. Unknown.

COMMENTS. *A. anchisiades* is remarkable for the shortness of certain tarsal segments; because of this feature it is distinct from all the other species included in this revision, with the exception of *achterbergi*. It is also to some extent characterised by the appearance of the head in facial view and also by the bristly apex of the ovipositor sheaths.



*Agathis achterbergi* sp. n.

(Fig. 14)

♀, ca 4.5 mm long (excluding ovipositor). Black. Hind femur entirely black; hind tibia obscurely yellowish on apical half but with heavily blackened apex; a distinct prebasal, infusate band present. Wings brownish but less so than in the related *anchisiades*.

Head in facial view only moderately elongate (Fig. 14). Malar space about 0.66 times as long as longer diameter of eye. Galea short, slightly less than twice as long as wide, dull, coriaceous. Between antennal insertions a rather sharp keel that is sharply angled before it extends upwards, on a lower level, and unites with a deep, narrowly V-shaped cavity in front of anterior ocellus. Antenna long, thin, tapering towards apex, 31-segmented; flagellum distinctly more bristly than in *anchisiades*; segment 4 from apex about 1.66 times longer than wide. Thorax in profile like that of *anchisiades*. Notaulices deeply impressed. Sternaulus reaching posterior corner of mesopleurum. Side of pronotum anterior to oblique trough coarsely rugose-reticulate, especially on upper half. The two longitudinal keels of propodeum obscured by longitudinal rugosities; side panels in greater part smooth, polished. Areolet of fore-wing markedly 4-sided; radial cell rather long; distal abscissa of postmarginalis fully 0.75 times as long as proximal abscissa. Middle tarsus short, segment 4 hardly longer than wide; outer side of middle tibia with 5 rather weak teeth arranged more or less in a row; inner spur of hind tibia reaching middle of basal segment of hind tarsus; hind claw with strong, pointed lobe. Gaster of generalised form. Tergite 1 about as long as apically wide, rugulose but becoming smooth across apical quarter; rest of gaster highly polished. Ovipositor sheath hardly longer than gaster, bristly at apex as in *anchisiades*; ovipositor itself straight, rather thick.

## MATERIAL EXAMINED

Holotype ♀, **Holland**: Waarder (Z-H), Oostende, 18.v.1970 (*C. van Achterberg*) (RNH).

Host. Unknown.

COMMENTS. This species, as noted under *anchisiades*, is characterised by the shortness of the middle tarsus. The two species are in fact remarkably alike but the difference in the shape of the head in a facial view and in the length of the galea is too strong to fall within the range of specific variation. It is probable that *anchisiades* and *achterbergi* are representatives of a species-group which is characterised essentially by the shortness of the middle tarsus and the strong lobe of the hind claw.

*Agathis minuta* Niezabitowski

(Fig. 29)

*Agathis minuta* Niezabitowski, 1910: 81. Syntypes, POLAND (lost).

♂ ♀, 2.5–3.0 mm long (excluding ovipositor). Black. Hind femur infusate more or less throughout, sometimes flushed with paler colouring towards apex; hind tibia pale brownish to pale brownish yellow but paler parts of legs dingy.

♀. Head in facial view hardly lengthened, subtriangular (Fig. 29). Malar space very short, slightly less than half longer diameter of eye, 5:11. Mouth-parts very short; galea hardly longer than wide; preapical segment of labial palpus hardly twice as long as wide. A keel present between antennal insertions and almost always a rather well-defined V-shaped impression in front of anterior ocellus. Antenna with 23–25 segments. Thorax of generalised form, much like that of *glabricula* as seen in profile (cf. Fig. 41). Notaulices sharply defined. Sternaulus very short, isolated, not reaching posterior corner of mesopleurum. Propodeum tending to be rugose all over, the two medial, longitudinal keels sometimes obscured by rugosities. Areolet of fore-wing usually sharply triangular; radial cell rather small, distal abscissa of postmarginalis fully 0.66 times as long as proximal abscissa. Hind claw without a lobe; inner spur of hind tibia not reaching middle of basal segment of hind tarsus; outer side of middle tibia with 4–5 teeth arranged in a row (difficult to see because of infuscation of tibia). Gaster rather short and broad. Tergite 1 about as long as wide at apex and vaguely striate to rugose-striate all over. Tergites 2+3 with the usual, transverse, blister-like swelling at base and sometimes with traces of rugosity to sides of, and apical to, this swelling. Ovipositor sheath about as long as body but markedly variable in length.

♂. Like female in all essential details. Antenna thin, the preapical segment about twice as long as wide.

## MATERIAL EXAMINED

42 ♂, 84 ♀, **Germany, Great Britain, Ireland, Sweden.**

HOST. *Coleophora glaucicolella* Wood (Coleophoridae) on *Juncus inflexus* L. (England: Worcester, nr Redditch, 3 ♀, 1 ♂ (BMNH)).

COMMENTS. This is the most commonly represented species in all the collections examined and is widely distributed. Easy to recognise on three main features: the shape of the head in facial view, the shortness of the galea and the long distal abscissa of the postmarginalis.

### *Agathis asteris* Fischer

(Figs 31, 37)

*Agathis asteris* Fischer, 1966: 185. Holotype ♀, AUSTRIA (NM) [examined].

♂ ♀, 2.8–3.5 mm long (excluding ovipositor). Black. Hind femur blackish or at least considerably infuscate; general leg-colour much as in *minuta*.

♀. Head in facial view not much lengthened (Fig. 31). Malar space a little longer than half longer diameter of eye, 7:12. Mouth-parts much lengthened in comparison with *minuta*; galea about 1.5 times longer than malar space. Almost no keel between antennal insertions and virtually no impression in front of anterior ocellus. Head in dorsal view rather deeply hollowed out behind to receive the somewhat strongly narrowed, anterior part of thorax. Antenna with 21–23 segments (2 ex.); flagellum distinctly thickened beyond middle; segments at this thickened part varying from being almost square in outline to 1.25 times longer than wide. Thorax markedly elongate (Fig. 37); in profile almost twice as long as wide; in dorsal view considerably narrowed in front, much more so than in *minuta*. Sternaulus long, groove-like, sometimes almost absent. Propodeum with some sort of rugosity almost everywhere. Areolet of fore-wing distinctly 4-sided, narrowed above; distal abscissa of postmarginalis virtually absent. Hind claw without lobe; outer side of middle tibia with 3–5 teeth, difficult to see in two out of three females because tibia in greater part infuscate; hind spurs rather weak; inner one not reaching middle of basal segment of hind tarsus. Tergite 1 slightly longer than wide, striate-rugose all over. Basal half of tergites 2+3 without rugosity in the three females available. Ovipositor sheath about twice as long as gaster, distinctly a little widened at extreme apex; hairs on outer side of expanded part distinctly shorter and less obvious than those proximal to it.

♂. Like female. Antenna with 23 segments, thread-like; preapical segment twice as long as wide. Sternaulus virtually absent in the single example.

#### MATERIAL EXAMINED

**Austria:** 1 ♀ (holotype), Burgenland, Zitzmanns-dorfer Wiesen (*Kasy*) (NM); 3 ♀, 1 ♂, Illmitz, Einsetzlacke, 7.ix.1971, ex *Coleophora halophyella* Zimmerman (*Jäckh*) (EH).

HOST. *Coleophora halophyella* Zimmerman (Coleophoridae).

COMMENTS. This species is largely characterised by the long mouth-parts (cf. *minuta*, also a parasite of Coleophoridae), undecorated frons, elongate thorax and very short distal abscissa of the postmarginalis. Of the three last-mentioned characters it is mainly the elongate thorax that separates *asteris* from the *glabricula*-complex with its much more generalised thoracic form.

### *Agathis glabricula* Thomson

(Figs 28, 41, 46)

*Agathis glabricula* Thomson, 1895: 2228. LECTOTYPE ♀, SWEDEN (ZI), here designated [examined].

*Agathis albicostellae* Fischer, 1966: 399. Holotype ♀, AUSTRIA (NM) [examined]. **Syn. n.**

♂ ♀, 3.0–3.2 mm long (excluding ovipositor).

♀. Black. Hind femur black; hind tibia blackish on apical third with rather conspicuous, blackish, basal ring.

Head in facial view rather sharply narrowed below eyes (Fig. 28), strongly transverse in dorsal view. Virtually no trace of a keel between antennal insertions, and at most a shallow dimple in front of anterior ocellus. Malar space about 0.66 times as long as longer diameter of eye, 7:12. Galea 2.0–2.5 times longer than wide, about as long as malar space or sometimes a little shorter. Antenna with 25–28 segments; flagellum decidedly thin with the three preapical segments considerably longer than wide. Thorax in profile of generalised form (Fig. 41). Notaulices deeply impressed. Sternaulus deeply impressed, reaching posterior corner of mesopleurum. Sculpture of propodeum variable; sometimes the normally polished side panels (as in lectotype) covered with an intricately rugose sculpture. Areolet of fore-wing variable; mostly

4-sided, more rarely triangular; radial cell short; distal abscissa of postmarginalis hardly 0.33 times as long as proximal abscissa; proximal abscissa sometimes distinctly thickened. Outer side of middle tibia with 2–3 teeth; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus; hind tarsal claw mostly without trace of free lobe but sometimes distal end of weak, basal thickening produced to form a slight angulation or tooth (as in lectotype, Fig. 46). Tergite 1 about as long as apically wide, sculptured all over, the sculpture varying between even striation and rugose-striation. Basal half of tergites 2+3 with transverse, blister-like swelling and apical to this with a variable amount of broken, rugose-striation. Ovipositor sheath 1.33–1.50 times longer than gaster.

♂. Like female except for sexual differences.

#### MATERIAL EXAMINED

**Austria:** 1 ♀ (holotype), Braunsborg bei Hainburg, ex *Coleophora albicostella* Duponchel (NM). **Bulgaria:** 2 ♀, Rhodopi, Costinbrod, vi. (*Zaykov*) (ZC); 2 ♀, Valtshe, vii. (*Zaykov*) (ZC); 1 ♀, Plovdiv, ix. (*Zaykov*) (ZC). **Great Britain:** 3 ♀, 7 ♂, Dorset, Portland Bill, bred viii.1959 ex *Coleophora troglodytella* Duponchel, collected v.1959 (*Ford*) (BMNH). **Ireland:** 3 ♀, 1 ♂, Co. Clare, The Burren, ex *Coleophora troglodytella* Duponchel (*Bradley*) (BMNH). **Sweden:** 1 ♂ (lectotype), Skåne, Ilstorp (*Thomson*) (ZI).

**Host.** *Coleophora troglodytella* (Duponchel) (Coleophoridae).

**COMMENTS.** Fischer (1957a: 11) examined the syntypes of *glabricula* and labelled one of them 'Agathis glabricula Th.Type' but did not publish the designation; this specimen is here designated lectotype and is labelled accordingly.

This species and the two that follow present a difficult taxonomic problem and only a provisional solution is suggested. In certain respects, such as length of ovipositor and perhaps also of galea, the three species appear to overlap. They may be forms of a single species whose variation in structure could be due to the effect of extrinsic factors. However, since names exist for the three segregates, they are kept separate until more material or biological information becomes available.

### *Agathis meritionellae* Fischer

(Fig. 27)

*Agathis meritionellae* Fischer, 1957b: 1. Holotype ♀, AUSTRIA: Karawanken (ZSBS) [not examined].

♀. This segregate differs from *glabricula* only in the following details.

Galea a little shorter. Head in facial view triangular, less narrowed below eyes (Fig. 27). In two females (paratypes), ovipositor sheath clearly longer than gaster; in five females from England, Worcester City, it is hardly longer, and in one the propodeum is rugose all over, as in some of the females of *glabricula* recorded from England, Portland Bill. The specimens from Sweden have the ovipositor sheath hardly longer than the gaster.

#### MATERIAL EXAMINED

**Austria:** 2 ♀, 1 ♂ (paratypes), Karawanken, Loibtal, ex *Coleophora meritionella* Klimesch (EH). **Great Britain:** 5 ♀, Worcester, ex *Chrysoesthia hermannella* F. (BMNH). **Sweden:** 17 ♀, 7 ♂, Lund, ex *Chrysoesthia* (*Microsetia* on label) *sexguttella* (Thunberg) (ZI, 2 ♂, 6 ♀, in BMNH).

**Hosts.** *Coleophora meritionella* Klimesch (Coleophoridae). *Chrysoesthia sexguttella* (Thunberg); *Chrysoesthia hermannella* (F.) (Gelechiidae).

### *Agathis artemesiana* Fischer

(Fig. 24)

*Agathis artemesiana* Fischer, 1966: 397. Holotype ♀, AUSTRIA (NM) [examined].

This species, which may belong to the *glabricula*-aggregate, differs from *glabricula* and *meritionellae* as follows.

♀, ca 3.5 mm long (excluding ovipositor); slightly larger than the other two species. Wings slightly more darkened. Head in facial view slightly more elongate than in *meritionellae*, more like that of *glabricula* (cf. fig. 28); in dorsal view (Fig. 24). Flagellum distinctly thickened distal to middle, the thickest segments being no more than 1.25 times longer than wide; antenna 24–26-segmented. Areolet triangular or almost so. Ovipositor sheath apparently always short, about as long as gaster.



## MATERIAL EXAMINED

**Austria:** 1 ♀ (holotype), Schlossofer Platte, Marchfeld (*Kazy*) (NM). **Bulgaria:** 2 ♀, Rhodopi, Nikolovo, viii.1976, on *Medicago sativa* L. (*Zaykov*) (ZC); 1 ♀, Velingrad, viii.1977 (*Zaykov*) (ZC); 1 ♀, Plovdiv, ix.1976 (*Zaykov*) (ZC). **Great Britain:** 1 ♀, Cambridgeshire, Fleam Dyke, 20.vii.1958 (*Ford*) (BMNH); Cornwall, St Osyth, 3.viii.1914 (*Harwood*) (BMNH). **Ireland:** 3 ♀, Co. Louth, Baltray, 23.vii.1941 (*Stelfox*) (BMNH); 1 ♀, Co. Kildare, Royal Canal, 30.vi.1950 (*Stelfox*) (BMNH). **Sweden:** 1 ♀, Skåne, Degaberga, 14.vii.1938 (*Perkins*) (BMNH).

**Host.** *Coleophora granulata* Zeller (Coleophoridae).

**COMMENTS.** What characterises this species, if indeed it is distinct, is the shape of the middle segments of the flagellum.

*Agathis pedias* sp. n.

(Figs 15, 39)

♀, 4.5–4.8 mm (excluding ovipositor). Black. Hind tibia pale yellowish, almost whitish, with dark basal ring and apical infuscation occupying about apical two-fifths. Wings pale compared with other species, almost hyaline.

Head in facial view weakly elongate (Fig. 15). Virtually no keel between antennal insertions and only a very feeble impression in front of anterior ocellus. Malar space about 0.66 times as long as longer diameter of eye. Mouth-parts rather short; galea as long as malar space, markedly coriaceous. Antenna with 24–25 segments. Thorax decidedly lengthened, twice as long as wide in profile; hardly different from that of *fulmeki* (cf. Fig. 42). Sternaulus fairly sharply defined but remote from both anterior and posterior margin of mesopleurum. Panels of propodeum not extensively polished, sometimes almost obscured by encroaching lateral rugosities. Outer side of middle tibia with 8–10 teeth arranged in a row, some of them paired; inner spur of hind tibia hardly more than 0.33 times as long as basal segment of hind tarsus; legs long, slender; 3rd segment of hind tarsus very slightly longer than apical segment; hind claw with weak, angular projection at base. Areolet of forewing almost 4-sided; distal abscissa of postmarginalis about 0.75 times as long as proximal abscissa. Gaster somewhat long, narrow (Fig. 39); tergite 1 about 1.33 times longer than apically wide, rugose-striate all over. Ovipositor sheath as long as body.

## MATERIAL EXAMINED

Holotype ♀, **Spain:** Cadiz, Villamartin, 11.vi.1960 (RNH).

Paratypes. **Spain:** 2 ♀, same data as holotype (RNH, BMNH); 1 ♀, Alicante, Puerto de Confrides, (*H. Teunissen*) (RNH). **Portugal:** 1 ♀, Caldes da Rainha, 14.v.1958 (RNH); 2 ♀, Trajouce, San Domingos de Rana, 15.v.1958 (RNH). **Greece:** 1 ♀, Athens, Imittós, 26.iv.1980 (BMNH).

**Host.** Unknown.

**COMMENTS.** The relatively large number of teeth on the outer side of the middle tibia suggests that *pedias* has an affinity with *fulmeki*, but the latter has shorter legs, a much more clearly defined impression in front of the anterior ocellus and a longer galea. A decidedly slender habitus is somewhat characteristic of *pedias*.

*Agathis rostrata* Tobias

*Agathis rostrata* Tobias, 1963: 881. Holotype ♀, U.S.S.R. (AS) [not examined].

My interpretation of this species is based on an examination of a single female determined by Tobias. This specimen bears the label 'W. Russland, Jurburg (Winogradoff–Nikitin)' and is probably that which Tobias records from Lithuania, Jurbakas, in his original description. Although the data agree, Tobias does not indicate that it is a paratype, merely labelling it as '*Agathis rostrata* sp. n., Tobias det.'

♀, 3.5–4.0 mm long (excluding ovipositor). Similar to *anglica* with which it may be compared as follows. On the whole darker in colour (this may have little significance). Paler parts of hind tibia dingy yellow; dark ring at base of hind tibia sometimes united with infuscate, apical part by a dark band along upper surface. Head in facial view more gradually narrowed towards mouth. Mouth-parts longer; galea 1.25–1.33 times longer than malar space and rather abruptly narrowed in apical half. No trace of keel between antennal insertions and at most the merest trace of a dimple in front of anterior ocellus. Antenna with 24–26 segments: 24 (1), 25 (2), 26 (1). Thorax slightly shallower than in *anglica*, seen in profile. Side of pronotum anterior to oblique trough more distinctly rugose-striate. Sternaulus different in that it reaches anterior margin of mesopleurum as foveate rugosity or row of foveae. Sculpture of propodeum variable as in

*anglica*; sometimes rugose almost all over. Radial cell short as in *anglica* and areolet equally 4-sided; distal abscissa of postmarginalis slightly longer. Gaster as in *anglica* but ovipositor sheath hardly as long as gaster plus propodeum.

#### MATERIAL EXAMINED

**Germany:** 1 ♀, Ruthe coll. (BMNH). **Great Britain:** 1 ♀, Kent, Eynsford, 24.vii.1932 (*Nixon*) (BMNH). **Italy:** 1 ♀, Südtirol, Algund, 1800 m, 30.viii.1967 (*Haeselbarth*) (EH); 1 ♀, St Peter/Ahrntal, 1350 m (*Haeselbarth*) (EH). **Sweden:** 1 ♀, Skåne, Degaberga, 12.vii.1938 (*Perkins*) (BMNH); 1 ♀, Silvakra, viii.1976 (*Huddleston & Quinlan*) (BMNH). **U.S.S.R.:** 1 ♀, Lithuania, Jurbakas (*Winogradoff-Nikitin*) (AS).

**Host.** Unknown.

**COMMENTS.** This species is essentially characterised by its long sternaulus, which reaches the anterior margin of the mesopleurum, and the long, rather subtly distinctive galea.

### *Agathis pappei* sp. n.

(Fig. 12)

♀, 3.0–3.5 mm (excluding ovipositor). Black. Legs obscurely yellowish where they are pale; hind femur infusate but yellowish at apex; in two out of three examples, including type, pale colour at apex of hind femur extends as a pale band along dorsal surface as far as base. Wings almost hyaline.

Head in facial view only weakly lengthened (Fig. 12). Face very shiny, with variable amount of somewhat indistinct punctation, more clearly evident in holotype. Anterior margin of clypeus somewhat protuberant. Mouth opening wide and mandibles of powerful build. Malar space 0.66 times as long as longer diameter of eye. Galea about twice as long as wide and as long as malar space. No trace of an impression or dimple in front of anterior ocellus. Antenna short, thin, with 22–24 segments. Mesoscutum a little flattened, its middle lobe, and to a less extent, lateral lobes, with some vague, rather sparse punctation. Notaulices deeply impressed, foveate, their outer margin bordered with a row of indistinct punctures. Scutellum slightly depressed behind and rugulose here. Areolet of forewing weakly 4-sided; stigma rather broad; apical abscissa of postmarginalis almost absent. Hind femur slightly more than twice as long as wide, the legs being rather short and thick; inner spur of hind tibia hardly reaching middle of basal segment of hind tarsus; claws rather long, without basal lobe or tooth. Sternaulus in the form of a fine groove, not reaching anterior margin of mesopleurum. Gaster somewhat short. Tergite 1 about 1.25 times longer than apical width, indistinctly striated more or less all over; rest of gaster smooth, shining. Ovipositor sheath as long as gaster plus propodeum.

#### MATERIAL EXAMINED

Holotype ♀, **Hungary:** Or, Sz. Miklós, 1.xi.1917 (HNHM).

Paratypes. **Hungary:** 2 ♀, Tompa, 11.ix.1962 (*Solymosné*) (HNHM, BMNH).

**Hosts.** Unknown.

**COMMENTS.** This aberrant species cannot be confused with any other from the region; it is characterised mainly by the shape of the head as seen from in front, the wide mouth-opening and the correspondingly large, powerful mandibles.

### *Agathis gracilipes* Hellén

*Agathis gracilipes* Hellén, 1956: 122. Lectotype ♀, FINLAND (ZH), designated by Tobias [examined].

I have not been able to discover where or even whether the lectotype designation was published.

♂ ♀, 4.0–4.5 mm (excluding ovipositor). Black. Hind femur infusate but paler in apical half; hind tibia obscurely yellowish, darkened over apical two-fifths, with a broad but faint infusate band at base.

♀. Head in facial view not very elongate. Malar space slightly shorter than longer diameter of eye, 10:13. Galea very short, hardly longer than wide. No trace of keel between antennal insertions; a very weak, V-shaped impression in front of anterior ocellus. Head in dorsal view strongly transverse, evenly rounded behind eyes. Antenna long, thin, with at least 26 segments. Thorax of generalised form, 1.5 times longer than wide in profile. Notaulices deeply impressed. Sternaulus well defined, rugose, reaching posterior margin of mesopleurum and also, through a line of rugose-punctation, anterior margin. Propodeum with two weak, longitudinal keels; lateral panels polished medially. Radial cell rather long; areolet sharply triangular; distal abscissa of postmarginalis fully 0.5 times as long as proximal abscissa. Legs

long, thinner than in any other included species; 3rd segment of middle tarsus fully 2.5 times longer than wide; hind femur 4.5 times longer than wide; hind claw without lobe but with slight, basal thickening; outer side of middle tibia with one, indistinct tooth. Tergite 1 about 1.33 times longer than apically wide. Basal half of tergites 2+3 with some vague, rugose-striation towards sides. Ovipositor sheath about as long as body.

♂. Antenna with 26 segments, long, thin, with apical segment fully 1.5 times longer than wide. Areolet of fore-wing with short stalk. Otherwise like female.

#### MATERIAL EXAMINED

**Finland:** 1 ♀ (lectotype), Tvärminne, Henriksberg (ZH); 1 ♂, 1 ♀, Kexholm, 17.vii.1923 (*Krogerus*) (♂ in ZH, ♀ in BMNH).

**Hosts.** Unknown.

**COMMENTS.** This species occupies a marginal position within *Agathis*. Because of its long, slender legs and very short mouth-parts it could not be confused with any other species under review.

### *Agathis melpomene* sp. n.

♂ ♀, 4.8–5.0 mm long (excluding ovipositor). Black. Hind femur yellowish, contrastingly darkened on apical one-third to two-fifths.

♀. Head in facial view elongate and considerably narrowed below eyes; in lateral view, line of face and that of clypeus appear virtually in one plane. No keel between antennal insertions and virtually no impression in front of anterior ocellus. Galea 1.35–1.50 times longer than malar space, faintly coriaceous and rather abruptly narrowed from middle to apex. Antenna with 28 segments; flagellum virtually filiform. Thorax of generalised form. Notaulices deeply impressed throughout. Sternaulus strongly developed, reaching posterior corner of mesopleurum, and in one paratype (Markovo) extending also as far as anterior margin of mesopleurum. Propodeum with usual, two longitudinal keels; lateral panels towards anterior dorsal surface covered with coarse shiny rugosity. Radial cell rather long; distal abscissa of postmarginalis fully 0.75 times longer than proximal abscissa; areolet 4-sided but distinctly narrowed towards edge of wing. Outer side of middle tibia (holotype) with a row of 8 rather broad-based teeth, some of them overlapping; 6–7 teeth in the two paratypes; these slightly smaller and less close together than in holotype; inner spur of hind tibia about two-fifths as long as basal segment of hind tarsus; hind claw with conspicuous, dentiform lobe and wide cleft between this and claw proper. Tergite 1 hardly longer than apically wide; almost smooth in the two paratypes but with vague rugosity over middle part in holotype. Tergites 2+3 polished, smooth (cf. *anglica*). Ovipositor sheath hardly as long as gaster plus thorax.

♂. Antenna with 25–27 segments; flagellum very thin. In profile clypeus rises slightly above line of face. Outer side of middle tibia with 7 teeth.

#### MATERIAL EXAMINED

Holotype ♀, **Hungary:** Taratóvárós, 28.v.1959 (*Bajári*) (HNHM).

Paratypes. **Bulgaria:** 1 ♀, Rhodopi; 1 ♀, Markovo, 23.vi.1978 (*A. Zaykov*) (HNHM); 1 ♀, S. poljana, 24.vi.1975 (*A. Zaykov*) (BMNH).

Nonparatypic material. **Hungary:** 3 ♂, same data as holotype (HNHM; 1 in BMNH).

**Host.** Unknown.

**COMMENTS.** This species is at once separable from *anglica* by the size of the radial cell, the strongly developed, dentiform lobe of the hind claws and the reduction of sculpture on tergite 1. The presence of more numerous teeth on the outer side of the middle tibia is also of value though this character is likely to vary. The general conformation of the radial cell is like that of *varipes*, but *melpomene* is distinguished by the shape of the head in facial view. The males are variable, consequently they are excluded from the type-series.

### *Agathis montana* Shestakov

(Figs 9, 21)

*Agathis montana* Shestakov, 1932: 261. Holotype ♀, U.S.S.R. (AS) [not examined].

The present interpretation of this species is based on specimens compared with the holotype by Tobias.

♂ ♀, 3.5 mm (excluding ovipositor). Black. Hind femur infusate throughout in one female, tipped with



reddish in another (Kokcengir Hills) and entirely red in a third (Hungary: Vacz Csorög). Wings variably infusate.

♀. Head in facial view moderately elongate (Fig. 9); in lateral view of head, clypeus and face lie in the same plane (Fig. 21). Malar space a little shorter than longer diameter of eye, 10:13. Galea slightly longer than malar space, 13:10. No trace of a keel between antennal insertions. Virtually no trace of an impression or dimple in front of anterior ocellus. Antenna with 22–23 segments. Thorax in profile markedly elongate, nearly twice as long as wide, 25:14. Notaulices sharply defined but not deep so that lobes lack a markedly convex appearance. Sternaulus in form of fine groove, only weakly rugose, not reaching anterior margin of mesopleurum. Propodeum sculptured all over in one female (Kokcengir Hills) but with polished area within lateral panels in the others. Areolet of fore-wing clearly 4-sided, though sometimes triangular according to Tobias; distal abscissa of postmarginalis hardly 0.33 times as long as proximal abscissa. Claws rather long, without basal tooth or basal thickening; outer side of middle tibia with a row of 4–6 rather thick teeth; hind femur somewhat thick, 2.5 times as long as wide; inner spur of hind tibia a little less than 0.5 times as long as basal segment of hind tarsus. Tergite 1 about as long as apically wide, finely rugose-striate all over. Ovipositor sheath about as long as gaster plus propodeum.

♂. Like female except for sexual differences. Antenna short, very thin; segment 4 from apex fully twice as long as wide.

#### MATERIAL EXAMINED

**Hungary:** 1 ♀, Vacz Csorög (Biró) (HNHM); 1 ♀, Gyula, Veszelycsarda, 19.xi.1963 (Moczar) (HNHM); 1 ♀, Apajpuszta (Moczar) (HNHM). **U.S.S.R.:** 1 ♀, 1 ♂, Kazakhstan, Zhana-Arka, Karagand, viii–ix.1959 (Tobias) (AS); 1 ♀, Moldavia, Kishenev, 8.x.1966 (Goncharenko) (AS).

HOST. Unknown.

COMMENTS. This somewhat squat-looking species is largely characterised by the shortness of the antenna and the elongate thorax. In respect of leg coloration and the shape of the areolet of the fore-wing *montana* is, as Tobias points out, extremely variable. There is also a subtle distinctiveness in the shape of the head as seen in profile, but it is based on features that are not easily described.

### *RHAMPHAGATHIS* Tobias

*Rhamphagathis* Tobias, 1962: 1195. Type-species: *Agathis nasicornis* Telenga, by monotypy.

DIAGNOSIS. Face very broad across clypeus; latter in profile projecting as a snout. Labrum small, transverse. Mandible seen from in front, broadened, flattened, with two blunt, short teeth at apex; thus seen, mandible almost lamelliform. Mesoscutum in dorsal view flattened, with strongly produced anterior corners. Propleura much flattened in dorso-ventral direction, their posterior margin reflexed to accommodate base of anterior coxae. Wing-venation like that of *Agathis*. Legs rather short; hind femur very stout.

### *Rhamphagathis nasicornis* (Telenga)

*Agathis nasicornis* Telenga, 1955: 253. Lectotype ♀, U.S.S.R.: Kharkov (AS), designated by Tobias, 1962: 1195 [not examined].

♂ ♀, 3.5–4.0 mm long (excluding ovipositor).

♀. Black. Hind femur deeply infusate; hind tibia obscurely yellowish on basal half with faint dark band near base.

Head in facial view as long as broad; seen from above with occiput deeply emarginate, the margin falling away steeply, almost angularly where it reaches posterior ocelli. Galea very slightly longer than malar space. In front of anterior ocellus hardly a trace of a dimple but with short keel extending downwards between antennal insertions. Antenna thin, thread-like, with 27–28 segments. Thorax in profile markedly elongate. Propleura curiously flattened, dull, rugulose all over, densely pubescent and contrasting with smooth, highly polished side of pronotum. Middle lobe of mesoscutum projecting far forwards on each side to form a conspicuous shoulder; these shoulders coarsely rugose where they join notaulices; in profile, flattened mesoscutum falls perpendicularly to pronotum. Notaulices distinct throughout, slightly widened in front and here rugose-foveate. Sternaulus in form of thin groove reaching posterior corner of mesopleurum but not anterior margin of this. Legs rather short, thick; hind femur twice as long as wide; outer side of middle tibia with 6–10 thick, spine-like teeth on apical half; front coxa rather small, flattened on lower side and here with sculpture similar to that of propleura and in sharp contrast with smooth, shiny surface of middle and posterior coxae; claws with a lobe. Radial cell rather narrow; areolet in female almost triangular; distal abscissa of postmarginalis very short, reduced almost to a point. Gaster somewhat

short; tergite 1 about 1.25 times longer than apically wide, much widened towards apex; surface finely, rather weakly striated. Ovipositor sheath very slightly longer than gaster.

♂. Antenna with 26 segments (2 ex.); flagellum very slender; two preapical segments fully twice as long as wide. Otherwise like female except for sexual differences.

#### MATERIAL EXAMINED

Germany: 2 ♂, 2 ♀, Ruthe coll. (BMNH). U.S.S.R.: 1 ♀, Melito (*Kokujev*) (AS).

Host. Unknown.

COMMENTS. This is a highly peculiar, quite isolated species. Apart from its generic features, it resembles the genus *Agathis* in general habitus. The curious appearance of the propleura suggests an adaptation to a specialised mode of existence. Among the species from the region *Rhamphagathis nasicornis* is easily recognised by its protuberant clypeus and prominent mesoscutal shoulders.

### MICRODUS Nees von Esenbeck

*Microdus* Nees von Esenbeck, 1814: 184. Type-species: *Ichneumon calculator* Fabricius, by subsequent designation (Haliday in Westwood, 1840: 63, synopsis).

DIAGNOSIS. ♂ ♀. Head in facial view transversely elliptical. Frons in front of anterior ocellus without deepened and margined pit or furrow (cf. *Agathis*). Mouth-parts unmodified, never lengthened to form a beak-like structure; galea not longer than wide; maxillary palpus often appearing 3-segmented because preapical segment (3rd) sometimes so short as to be hardly noticeable; this segment always conspicuously shorter than apical segment. Sternaulus always present. Venation much as in *Agathis* (cf. Fig. 50); 1st discoidal cell and 1st cubital cell not separated by a vein; 2nd cubital cell always in form of small triangular or subtriangular areolet; distal abscissa of postmarginalis fully as long as proximal abscissa. Outer side of middle tibia with 2–8 teeth, usually 3–4. Ovipositor at least 0.66 times as long as gaster.

Holarctic in distribution.

Muesebeck (1927) considered that *Microdus* could not be retained as a genus separate from *Agathis* and accordingly synonymised them. His opinion was based on a study of North American material and found its support in the breakdown of the single character – the shape of the head – traditionally used to separate the two genera.

Telenga (1955: 273) reinstated *Microdus* without giving reasons for rejecting Muesebeck's opinion. He has been followed by Tobias (1976b: 97) who recognised *Microdus* on biological rather than morphological grounds. Tobias argues that *Agathis* species, because of their lengthened mouth-parts, tend to inhabit arid, steppe-like regions where flowers conceal their nectar in deep corollas, a floral adaptation, Tobias adds, that makes the nectar available to long tongued insects inhabiting regions where they are exposed to moisture deficiency. *Microdus*, on the other hand, is considered to be largely dependent on Lepidoptera feeding on forest trees and in consequence is well represented in the richly forested regions of the Far East.

Tobias' observations are probably pertinent to the biology of the Agathidinae but it is arguable whether they provide a foundation for validating genera in a group with so unstable a classification as the Braconidae.

Nevertheless, the two genera can be separated on sound morphological characters as follows.

- 1 Mouth-parts lengthened in the form of a beak, galea rarely as short as 1.33 times longer than wide, nearly always much longer; head in facial view lengthened (Figs 1–6); ocelli in a high triangle, the posterior tangent to the anterior ocellus passing freely in front of posterior pair; foramen of metasternum accommodating hind coxa not closed on inner side by a sclerotized bridge.
- Mouth-parts not lengthened in the form of a beak, the galea not longer than wide; head in facial view transversely elliptical; ocelli in a low triangle, the posterior tangent to the anterior ocellus usually cutting, or at least touching, posterior pair; foramen of metasternum accommodating hind coxa closed on inner side by a sclerotized bridge.

**AGATHIS** Latreille

**MICRODUS** Nees von Esenbeck

#### Key to species (females)

- 1 Claws unarmed, without basal lobe; whole of hind leg blackish, except for yellowish band at extreme base of tibia.  
Thorax marked with black and red..... *calculator* F. (p. 217)

- Claws armed with conspicuous basal lobe; at least hind tibia predominantly pale..... 2
- 2 Inner margins of antennal sockets uniting to form a smooth knob that may be prolonged behind to form a short, blunt keel; tergites 2+3 with at least basal half with a well-defined sculpture that extends as far as the middle transverse suture or beyond..... 3
- Inner margins of antennal sockets widely separated (except in *pumilus* but this species has ovipositor sheath much shorter than gaster), the surface between them either flat, smooth, with weak medial groove or (rarely) rugose; tergites 2+3 at most with some vague sculpture on basal half..... 7
- 3 Sculpture of tergites 2+3 tending to cease abruptly at second suture; at most faint traces of scaly-reticulation on apical half of tergite ..... 4
- Sculpture of tergites 2+3 extending almost to apex ..... 6
- 4 Basal half of tergites 2+3 with sharp, shiny, longitudinal striation; ovipositor sheath much longer than gaster..... *dimidiator* Nees von Esenbeck (p. 219)
- Basal half of tergites 2+3 with somewhat confused rugosity, the longitudinal elements varying much in intensity; ovipositor sheath at most slightly longer than gaster ..... 5
- 5 Notaulices almost fading out on disc; sculpture of basal half of tergites 2+3 consisting of vague scaly-reticulate rugosity with only weak longitudinal elements  
*lugubator* Ratzeburg (p. 219)
- Notaulices sharply defined throughout; sculpture of basal half of tergites 2+3 with a predominant sculpture of striation..... *fortipes* Reinhard (p. 220)
- 6 Tergites 2+3 evenly, longitudinally striate; hind tibia, except for darkened apex, reddish yellow ..... *rufipes* Nees von Esenbeck (p. 218)
- Tergites 2+3 not evenly striate, being in part rugulose to scaly-reticulate; hind tibia whitish with darkened apex and darkened, basal ring ..... *rugulosus* Nees von Esenbeck (p. 217)
- 7 Radius distinctly bent inwards at middle towards stigma; gaster often conspicuously pale-marked ..... 8
- Radius straight or almost so; gaster virtually always black..... 11
- 8 Small species not exceeding 3.2 mm; gaster entirely black or blackish; hind femur blackish or at least deeply infusate ..... 9
- Larger species not less than 4.5 mm; gaster with at least basal half of tergites 2+3 reddish or yellowish (rarely gaster entirely dark); hind femur red..... 10
- 9 Radius very strongly bent inwards towards stigma, markedly colourless in middle third; notaulices deeply impressed throughout; hind tibia whitish, infusate on rather less than apical half and usually with dark basal ring..... *cingulipes* Wesmael (p. 221)
- Radius less bent inwards towards stigma, darker at middle; notaulices almost absent on disc; hind tibia dull reddish with less apical infuscation and with hardly a trace of a basal band  
*nugax* Reinhard (p. 222)
- 10 Head in facial view slightly elongate (Fig. 32); internal rim of antennal sockets with distinct dentiform projection; hypopygium emarginate at apex, appearing strongly truncate in profile ..... *linguarius* Nees von Esenbeck (p. 223)
- Head in facial view strongly transverse (Fig. 30); internal rim of antennal sockets without such a projection; hypopygium not emarginate at apex, appearing pointed in profile.  
Usually entire gaster, except tergite 1, reddish yellow..... *conspicuus* Wesmael (p. 225)
- 11 Head in facial view somewhat elongate ..... 12
- Head in facial view not elongate ..... 13
- 12 Internal rim of antennal socket raised to form a distinct, dentiform projection; in profile, head behind lowest point of eye only weakly concave ..... *linguarius* Nees von Esenbeck (p. 223)
- Internal rim of antennal socket without such a dentiform projection; in profile, head behind lowest point of eye rather deeply concave.  
Gaster beyond tergite 1 entirely reddish yellow, wings, strongly infumate *zaykovi* sp. n. (p. 226)
- 13 Ovipositor sheath hardly 0.66 times as long as gaster ..... *pumilus* Ratzeburg (p. 221)
- Ovipositor sheath much longer than gaster ..... 14
- 14 Tergite 1 with a sculpture of fine scaly-reticulation with at most traces of striation towards sides  
*eriphyle* sp. n. (p. 222)
- Tergite 1 without scaly-reticulation, the surface either almost smooth or with longitudinal striation varying in intensity ..... 15
- 15 Hind femur stout, 3 times as long as wide; gaster shorter and broader; antenna with 29-31



segments; always an elongate, pale mark against posterior margin of eye

- Hind femur not so stout, at least 3·5 times longer than wide; antenna with not less than 33 segments; gaster longer, narrower ..... *tumidulus* Nees von Esenbeck (p. 224)
- Hind femur not so stout, at least 3·5 times longer than wide; antenna with not less than 33 segments; gaster longer, narrower ..... *clausthalianus* Ratzeburg (p. 224)

### *Microdus calculator* (Fabricius)

*Ichneumon calculator* Fabricius, 1798: 225. Holotype ♀, ITALY (ZM) [not examined].

*Microdus calculator* (Fabricius) Nees von Esenbeck, 1834: 144.

*Microdus abscissus* Ratzeburg, 1844b: 58. Holotype ♂, GERMANY (lost). [Synonymised by Ratzeburg, 1852: 45.]

*Agathis calculator* (Fabricius) Shenefelt, 1970: 323.

*Microdus calculator* (Fabricius) Tobias, 1971: 260.

There never has been any doubt about the identity of this species.

♂ ♀, 6·0–7·5 mm long (excluding ovipositor). At least head, propodeum and gaster black; sometimes mesosternum also black; rest of thorax red. Whole of hind leg blackish except for a pale, yellowish band at extreme base of tibia. Wings more or less hyaline.

♀. Head in facial view like that of *linguarius* (cf. Fig. 32), less transverse than in other species; seen from above, very short, strongly transverse. A single blunt, almost knob-like keel between antennal sockets. Ocelli in a low triangle, the posterior tangent to anterior ocellus just touching posterior pair. Preapical segment (3rd) of labial palpus well developed, fully 2·5 times longer than wide. Antenna with 34–35 segments. Notaulices deeply impressed throughout. Sternaulus broad, costate. Prepectal margin clearly defined. Propodeum very coarsely reticulate but without discrete, longitudinal keel or keels. Areolet of fore-wing triangular, usually with short stalk; distal abscissa of postmarginalis about as long as proximal abscissa; anal cell of hind-wing without anellus. Outer side of middle tibia with 3–4 isolated teeth; claw of hind tarsus without trace of either lobe or tooth. Tergite 1 1·33–1·50 times longer than its apical width, strongly, evenly striate all over. Basal half of tergites 2+3 with sculpture like that of tergite 1 but sculpture less regular and not reaching apical corners of this half of tergites 2+3; sculpture tends to be confined to transverse, blister-like basal area. Ovipositor sheath about as long as thorax plus gaster.

♂. Like female but frequently darker; mesopleurum sometimes completely blackened.

#### MATERIAL EXAMINED

**Great Britain:** 1 ♀, Hampshire, New Forest, Bishop's Dyke, emerged 21.v.1963 from lepidopterous larva pupating under dead bark of beech (*Fagus*) (BMNH); 4 ♂, Winchester, flying around dead beech tree, viii.1979 (*Else*) (BMNH); 2 ♂, 3 ♀, Surrey, Mickleham, ex *Scardia boleti*, v.1933 (*Ford*) (BMNH); 2 ♂, 3 ♀, Box Hill, vii.1938, ex *Scardia boleti* (*Ford*) (BMNH).

**Hosts.** *Morphaga boleti* (Fabricius) (Tineidae) and probably also *Triaxomera parasitella* (Hübner) (Tineidae). According to records quoted by Shenefelt (1970), various people have bred *calculator* from these two lepidopterous hosts.

**COMMENTS.** This is an unmistakable species, at least in the region under consideration, and is readily characterised by its red and black colour, large size and, most significantly, by the unique simple claws.

### *Microdus rugulosus* Nees von Esenbeck **comb. rev.**

*Microdus rugulosus* Nees von Esenbeck, 1834: 148; Reinhard, 1867: 357. Holotype ♀, GERMANY (lost).

*Braunsia rugulosa* (Nees von Esenbeck) Telenga, 1955: 278; Shenefelt, 1970: 376.

Reinhard was the first reviser of this species and from his excellent treatment of it, the identity of *rugulosus* is not in doubt.

♀, 4–5 mm long (excluding ovipositor). Head and thorax black. Gaster usually entirely blackened above but frequently pale-marked towards apical corners of tergites 2+3; in such cases, the segments posterior to the pale area tend to be entirely pale yellowish brown or reddish brown; in one example (Surrey, Mickleham), basal half of tergites 2+3 is bright reddish yellow. Hind femur varying from entirely infuscate to entirely reddish yellow; when hind femur is pale, the hind tibia is contrastingly whitish with apical third and a basal band infuscate; in examples with darkened hind femur, the tibia is correspondingly darkened; hind coxa reddish yellow over most of basal half or entirely infuscate.

Head in facial view transverse, as in majority of species (cf. Fig. 30). Frons between antennal sockets showing as a smooth, weakly rounded boss, laterally compressed to form a single, short, rounded ridge.

Segment 3 of labial palpus fully 0.66 times as long as apical segment. In front of anterior ocellus an obsolescent, V-shaped depression. Ocelli in a low triangle, the posterior tangent to anterior ocellus virtually touching posterior pair. Antenna with 30–34 segments: 30 (5), 31(2), 34(1). Notaulices sharply defined but shallow, finely foveate throughout. Sculpture of propodeum variable, tending to fade out on each side of convexity, leaving an almost smooth area. Arcolet of fore-wing almost always sharply triangular; rarely with short stalk. Inner spur of hind tibia not reaching middle of basal segment of hind tarsus; hind claw with conspicuous, angular lobe; outer side of middle tibia with 2–3 well-separated teeth. Tergite 1 about 1.66 times longer than apically wide, with fine, mostly broken rugose-striation all over; where the striation becomes weak, towards apex of tergite, surface shows a considerable amount of weak scaly-reticulation. Tergites 2+3 almost 1.5 times longer than apically wide, sculptured almost all over; distal to 2nd suture, which shows as a shallow furrow, the surface is weakly scaly-reticulate, the sculpture tending to fade out towards apical corners; basal to the suture (the area probably corresponding to the true second tergite), a weakly rugose furrow sets off the usual, transverse, slightly raised area; whole of basal half of tergites 2+3 vaguely rugose-striate with either the rugose or striate element predominating. Hypopygium sharply pointed at apex. Ovipositor sheath about equal to gaster plus thorax.

#### MATERIAL EXAMINED

**Germany:** 3 ♀, Ruthe coll. (BMNH). **Great Britain:** 2 ♀, Bucks., vii., on dead *Quercus* sp. (BMNH); 1 ♀, Essex, Epping Forest, viii.1954 (BMNH); 3 ♀, Hants., Romsey, vii.–viii.1980, from wood of dead *Larix* (*C. Vardy*) (BMNH); 1 ♀, Southsea, coll. 19.iii.1983, em. vi.1983, ex *Blastobasis lignea* in dead twigs of *Ulex* (BMNH); 1 ♀, Surrey, Mickleham, vii.1935 (BMNH). **Greece:** 1 ♀, Ilia, Olympia, vii.1979 (*Day, Else & Morgan*) (BMNH). **Ireland:** 4 ♀, Glengarriff, Lodge Woods, vii.1935, on *Quercus* sp. (*A. W. Stelfox*) (BMNH). **Switzerland:** 1 ♀, Wallis, Brig, 2.vii.1959 (*E. Bauer*) (EH).

**Host.** *Blastobasis lignea* Walsingham (Blastobasidae). According to Meyrick (1968), the larva of this moth feeds on dead leaf-refuse but this may also include dead wood which would explain the data given above.

**Comments.** Though variable both in colour and sculpture, this species is highly distinctive on the sculpture of the gaster; it could not be confused with any other *Microdus* from the region.

### *Microdus rufipes* Nees von Esenbeck

*Microdus rufipes* Nees von Esenbeck, 1814: 189. Syntypes, GERMANY (lost).

*Braunsia rufipes* (Nees von Esenbeck) Telenga, 1955: 277; Shenefelt, 1970: 375.

*Microdus rufipes* Nees von Esenbeck; Tobias, 1971: 260.

♂ ♀, 4–5 mm long (excluding ovipositor). Black; rarely basal third of tergites 2+3 reddish yellow (1 ♀, England: Suffolk, Sudbury). Hind coxa and hind femur bright reddish yellow; hind tibia slightly dusker than its femur and darkened on about apical third. A single female from Yugoslavia: Ristovaca has the face, mesoscutum and sides of thorax richly marked with paler colouring.

♀. Head like that of *rugulosus*. Structure of frons between antennal sockets like that of *rugulosus* but thickened keel tapering behind and uniting with a distinct V-shaped depression in front of anterior ocellus. Ocelli in a low triangle, the tangent to anterior ocellus cutting posterior pair. Antenna with 31–32 segments. Notaulices deeply impressed, much more so than in *rugulosus*. Propodeum covered with coarse, confused rugosities. Wings like those of *rugulosus* but distal abscissa of postmarginalis not longer than proximal abscissa. Outer side of middle tibia with 6–7 closely spaced teeth near apex; inner spur of hind tibia relatively longer than in *rugulosus* and almost reaching middle of basal segment of hind tarsus. Tergite 1 considerably widened towards apex, about 1.25 times longer than apically wide, strongly, evenly striate all over. Tergites 2+3 showing three transverse furrows of variable definition, its entire surface, except across surface distal to third furrow, with shiny, on the whole even, longitudinal striation. Tergites 4 and 5 sometimes with faint traces of scaly-reticulation. Ovipositor sheath about equal to length of thorax plus gaster.

♂. Like female. Rarely the striation at base of tergites 2+3 somewhat broken and transverse in direction.

#### MATERIAL EXAMINED

**Bulgaria, Great Britain, Sweden, Turkey, Yugoslavia.**

**Hosts.** *Cydia pomonella* (L.) (Tortricidae); *Spilonota ocellana* (Denis & Schiffermüller) (Tortricidae); *Hedya nubiferana* (Haworth) (Tortricidae); *Gypsonoma dealbana* (Frölich) (Tortricidae). The foregoing hosts are from specimens personally examined. Tobias (1971) cites the second two and in addition gives *Rhyacionia buoliana* (Denis & Schiffermüller) (Tortricidae).

COMMENTS. This is probably the most distinct of all European species of *Microdus* and is easily recognised by the even striation of the gaster. It is because of this highly characteristic striation that Telenga (1955) transferred *rufipes* to *Braunsia* Kriechbaumer but this genus is almost exclusively Afrotropical and though characterised by a striated gaster, it has no close affinity with *Microdus*.

***Microdus dimidiator* Nees von Esenbeck**

*Microdus dimidiator* Nees von Esenbeck, 1834: 146. Holotype ♀, POLAND (lost).

*Agathis dimidiator* (Nees von Esenbeck) Shenefelt, 1970: 329.

*Microdus dimidiator* Nees von Esenbeck; Tobias, 1971: 260.

♂ ♀, 4–5 mm (excluding ovipositor). Black; anterior corners of tergites 2+3 somewhat pale, the pale colouring sometimes forming a complete band across base of segment. Hind coxae usually entirely reddish yellow but sometimes becoming infusate towards base; hind femur reddish yellow; hind tibia whitish yellow but infusate on about apical third and with faint to absent darker ring near base. Wings almost hyaline.

♀. Head as in *rugulosus*. Between antennal sockets a gently rounded hump as in other species with sculptured gaster. Segment 3 of labial palpus poorly developed, almost moniliform and much shorter than apical segment. Posterior tangent to anterior ocellus virtually touching posterior pair. Antenna with 33–35 segments: 22 (2), 33 (1), 34 (2), 35 (2). Notaulices deeply impressed. Propodeum more coarsely and intricately rugose than in *rufipes*. Lobes of mesoscutum sometimes showing a weak, sparse punctation. Areolet of fore wing smaller than in *rufipes* and more markedly stalked. Hind spurs more powerfully built than in either *rugulosus* or *rufipes*, the inner one just reaching middle of basal segment of hind tarsus; outer side of middle tibia with 3–4 teeth arranged in a row and well separated from small cluster of teeth at extreme apex. Tergite 1 about 1.5 times longer than apically wide, longitudinally striate all over; striation close, dense, shiny. Tergites 2+3 with similar striation extending as far as second suture and here ending abruptly; distal to second suture, surface (corresponding to area of tergite 3) highly polished and sometimes showing the faintest trace of a transverse furrow. Ovipositor sheath about as long as body.

♂. Like female except for sexual differences. Tergite 1 tending to be a little longer than in female and striation of tergites 2+3 sometimes broken or obsolescent.

**MATERIAL EXAMINED**

**France:** 8 ♂, 15 ♀, Vaucluse, Mont Ventoux, bred vi.–vii.1970, 1980 ex *Tortrix viridana* L., on *Quercus* sp. (*P. du Merle*) (PdMC, 2 ♂, 5 ♀, BMNH). **Germany:** 1 ♀, Ruthe coll. (BMNH); 1 ♀, Saxony (*Reinh* . . .) (RNH). **Greece:** 1 ♂, Krausia, Oros, 4.vi.1973 (*Schach*) (RNH). **Holland:** 1 ♀ (on label 'v.Voll. Holl.') (RNH). **Poland:** 2 ♂, 3 ♀, Skierniewice, vi.–vii.1957 (1 ♀, labelled ex '*ocellana*') (*Wiackowski*) (BMNH). **Yugoslavia:** 1 ♀, Ristovaca, 8.vi.1982 (*Mihajlovic*) (BMNH).

**Hosts.** *Tortrix viridana* L. (Tortricidae); *Spilonota ocellana* (Denis & Schiffermüller) (Tortricidae).

COMMENTS. The female from Yugoslavia has the hind coxa blackish throughout, and the hind femur darkened with the apex almost infusate.

The traditional interpretation of *dimidiator* is certainly correct, for Nees von Esenbeck has carefully drawn attention to its salient features in his description. The essential character for recognising this species is the abrupt termination, at the second suture, of whatever sculpture exists on the basal half of tergites 2+3, i.e. the sculpture is sharply restricted to the surface of what is morphologically the second tergite. Further, *M. dimidiator* is more slenderly built than either *rugulosus* or *rufipes* and has noticeably longer legs.

***Microdus lugubator* Ratzeburg comb. rev.**

(Figs 57, 59, 63)

*Microdus lugubator* Ratzeburg, 1852: 45. Syntypes, GERMANY (lost).

*Agathis lugubator* (Ratzeburg) Fulmek, 1962: 103; Shenefelt, 1970: 341.

♂ ♀, 3.5–4.0 mm long (excluding ovipositor).

♀. Black, sometimes with paler colouring on gaster. Hind coxa deeply infusate; hind femur dull reddish yellow; hind tibia much the same colour but faintly darkened at apex. Wings considerably darkened.

Head not strongly transverse (Fig. 63). Frons between antennal sockets weakly raised to form a single, blunt, almost knob-like keel as in *rugulosus* and *rufipes*. Antenna with 28–31 segments: 28(2), 30(2), 31(1); scape rather short (Fig. 59). Ocelli in rather a high triangle, the posterior tangent to anterior ocellus not



touching posterior pair. Notaulices poorly defined, sometimes almost absent on disc. Propodeum coarsely, intricately rugose all over; sometimes with 2 fairly distinct, longitudinal keels. Legs rather thick; outer side of middle tibia with 3–4 well-spaced teeth in a row; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus. Areolet of fore-wing varying from distinctly triangular to distinctly 4-sided; distal abscissa of radius virtually straight, widely separated from stigma (Fig. 57). Gaster shorter and broader than in other species of the *rugulosus*-complex. Tergite 1 much widened to apex, about 1.25 times longer than apically wide, densely rugose-striate all over and usually with a clear indication of superimposed scaly-reticulation. Tergites 2+3 with a distinct 2nd suture and usually a curved furrow proximal to this; tergites 2+3 proximal to 2nd suture with a fine variable sculpture all over; within the slightly raised, basal area, sculpture usually shows distinct striate elements, sometimes transverse in direction; elsewhere sculpture a mixture of scaly-reticulation and fine striation; distal to 2nd suture, surface shows traces, sometimes very indistinct, of scaly-reticulation. Ovipositor sheath 0.66–0.75 times length of gaster.

♂. Gaster sometimes with dull reddish tinge. Antenna with 26–28 segments: 26(2), 28(1). In the scanty material available, gaster rather more coarsely sculptured than in female.

#### MATERIAL EXAMINED

**France:** 1 ♀, Gironde, 1936, ex *Coleophora* sp. (J. Suire) (BMNH); 1 ♀, Fontainebleau, viii.1936 (A. Alston) (BMNH). **Germany:** 1 ♀, Ruthe Coll. (BMNH). **Great Britain:** 1 ♀, Essex, Epping Forest, ex *Coleophora* case on oak bark (*Quercus* sp.), coll. 3.vii.1983, em. 25.vii.1983 (P. J. Johnson) (MS); 2 ♀, Hampshire, New Forest, ex *Coleophora lutipennella* Zeller or *C. flavipennella* Duponchel on *Quercus* sp., coll. 28.v.1983, em. 1983 (P. H. Sterling) (MS); 1 ♀, 1912, 1 ♀, 22.vii.1908 (G. T. Lyle) (BMNH); 1 ♀, Kent, Bexley, vii.1937, ex *Coleophora hemerobiella* Scopoli (R. L. E. Ford) (BMNH); 2 ♀, SE. London, Norwood, viii.1928 (J. H. Lowe) (BMNH); 1 ♀, Surrey, Ashted, viii.1928 (G. E. J. Nixon) (BMNH); 1 ♀, Worcester, Trench Wood, ex *Coleophora flavipennella* Duponchel, on *Quercus* sp., coll. vi.1983, em. vii.1983 (A. N. Simpson) (MS). **Hungary:** 1 ♀, Budapest, Kamaraerdő, 31.vii.1976 (J. Papp) (HNHM); 1 ♂, Nagykovacs, 30.vi.1973, ex *Coleophora* sp. (Szocs J.) (HNHM).

**HOSTS.** Evidently a parasite of various species of *Coleophora*: *Coleophora flavipennella* (Duponchel), *Coleophora hemerobiella* (Scopoli) and possibly *Coleophora lutipennella* (Zeller).

**COMMENTS.** This species is mainly characterised by its weak notaulices, sculpture of gaster and short ovipositor. Its nearest relative seems to be *fortipes* (see below).

### *Microdus fortipes* Reinhard

(Fig. 65)

*Microdus fortipes* Reinhard, 1867: 356. Syntype ♀. GERMANY (MNHU) [examined].

♂ ♀, 4–5 mm long (excluding ovipositor).

♀. Hind femur entirely deep reddish in two females (Munich) but much darkened in single female from Witzzenhausen; hind tibia much the same colour as hind femur but infusate at extreme apex. Wings markedly infusate, as in *lugubrador*. Head from above much more transverse (Fig. 65). Antenna shorter, thicker, with 23–25 segments; three preapical segments hardly longer than wide; in *lugubrador*, they are fully 1.25 times longer than wide; scape slightly longer. Thorax in profile much less elongate. Notaulices deeply impressed throughout. Propodeum with much coarser reticulate rugosity. Anella of hind wing not emitting an anal vein; in this respect markedly different from *lugubrador*; areolet of fore-wing (3 ♀, 2 ♂) always sharply triangular and sometimes with short stalk. Legs thicker than in *lugubrador*; outer side of middle tibia with a cluster of 8–10 teeth close to apex. Gaster as in *lugubrador* but tergite 1 and basal half of tergites 2+3 as far as second suture with irregular sculpture of shiny, longitudinal striation; on basal part of tergites 2+3 the striation tends to be concentric around a mid-basal area and towards sides shows weakly superimposed scaly-reticulation; distal to second suture, tergites 2+3 mainly polished with faint traces of scaly-reticulation and a transverse linear impression across middle. Ovipositor sheath almost as long as gaster plus propodeum; seen from above, hairs of apical fifth of ovipositor sheath shorter and less noticeable than in *lugubrador*.

♂. Like female except for sexual differences. Sculpture of gaster reduced; that on tergites 2+3 almost obliterated.

#### MATERIAL EXAMINED

**Germany:** 2 ♀, München (Buchecker) (BMNH); 2 ♂, 1 ♀, Witzzenhausen, viii.–ix.1965 (Haeselbarth) (EH).

HOST. According to Reinhard this species was bred frequently by Bouché from *Spilonota ocellana* (Denis & Schiffmüller) (Tortricidae).

COMMENTS. *Microdus fortipes* is perhaps more closely related to *lugubator* than to any other species from the region. From *lugubator* it is distinguished mainly by the more transverse head, the sculpture of the gaster and the much more deeply impressed notaulices. In *lugubator* the sculpture of the basal half of tergites 2+3 presents a dull, vaguely scaly-reticulate appearance in which longitudinal elements are poorly defined; in *fortipes*, on the other hand, the sculpture here is predominantly strong, longitudinal striation.

### *Microdus pumilus* Ratzeburg

*Microdus pumilus* Ratzeburg, 1844b: 57. Syntypes, GERMANY (lost).

*Agathis pumila* (Ratzeburg) Shenefelt, 1970: 350.

*Microdus pumilus* Ratzeburg: Tobias, 1971: 260.

♂ ♀, ca 2 mm (excluding ovipositor).

♀. Black. Hind femur deeply infuscate; hind tibia whitish on basal half with darkened subbasal band, infuscate on apical half.

Head rather deep from back to front, as seen from above; much as in *lugubator* (cf. Fig. 63). Ocelli in a high triangle, the posterior tangent to anterior ocellus passing far in front of posterior pair. Face having a shiny, convex, polished appearance. Frons between antennal sockets raised at middle to form a knob that is slightly lengthened in direction of anterior ocellus; in this respect similar to the *rugulosus*-group. Palpi short; segment 4 of maxillary palpus much shorter than 5. Notaulices shallow, sometimes fading out before reaching posterior fovea. Sternaulus shallow, broken, isolated and not reaching back as far as posterior corner of mesopleurum. Hind spurs weak, subequal, the inner one not reaching middle of basal segment of hind tarsus. Stigma rather broad; apical abscissa of postmarginalis considerably shorter than proximal abscissa. Outer side of middle tibia with 2–3 teeth, difficult to see because of infuscation of tibia; hind claw small but with distinct lobe. Gaster somewhat short; tergite 1 triangularly widened to apex, about 1.33 times longer than its apical width; delicately, somewhat brokenly, longitudinally striate. Ovipositor sheath about 0.66 times as long as gaster, shorter than in any other species from the region.

♂. Like female except for sexual differences. Antenna with 27 segments.

#### MATERIAL EXAMINED

**Germany:** 1 ♂, 6 ♀, S.-Holstein, Segeberg, ex *Coleophora laricella* Hübner (T. Weber) (EH). **Holland:** 1 ♀, Bergentheim, 9.vii.1975 (B. v. Aartsen) (RNH).

HOST. *Coleophora laricella* (Hübner) (Coleophoridae). This host, according to Meyrick (1968), is restricted to *Larix* (see discussion under 'Biology').

COMMENTS. This is the smallest species from the region and is most distinctive on account of its very short ovipositor. It stands apart from the other species with polished tergites (except tergite 1) because of the structure of the frons between the antennal insertions.

### *Microdus cingulipes* Nees von Esenbeck

(Fig. 55)

*Microdus cingulipes* Nees von Esenbeck, 1814: 189. Syntypes, GERMANY (lost).

Wesmael (1837: 18) was the first reviser of *cingulipes*; I have based my interpretation of the species on a specimen in Wesmael's collection bearing his handwritten identification label.

♀, 3.5–4.0 mm (excluding ovipositor). Black. Hind femur black; hind tibia obscurely whitish yellow at middle; deeply infuscate on apical two-fifths and with ring of infuscation near base.

Head in facial view as transverse as in majority of species; seen from above strongly transverse. Antennal sockets on their inner side joined to form a weakly bipartite projection. Ocelli in low triangle, the posterior tangent to anterior ocellus virtually touching posterior pair. Labial palpus with only 3 clearly visible segments. Antenna with 29–31 segments. Notaulices deeply impressed throughout, sometimes forming patch of rugosity where they unite behind. Sternaulus distinct throughout but narrow, linear and at most finely rugose. Propodeum rugose all over but showing no special feature. Hind spurs rather weak; inner spur of hind tibia falling far short of middle of basal segment of hind tarsus; outer side of middle tibia with 2–3 teeth just proximal to apical cluster of 3–4 teeth. Radius colourless over middle third, strongly bent inwards towards stigma and, where closest to this, separated from it by about thickness of radius itself (Fig.

55); stigma shorter and less wedge-shaped than in *tumidulus* and close allies. Tergite 1 1.50–1.66 times longer than its apical width, somewhat weakly striate all over. Tergites 2+3 basal to 2nd suture with usual, curved furrow, delimiting a transversely elliptical area; rarely this furrow finely costate; gaster otherwise smooth, polished. Ovipositor sheath about as long as thorax plus gaster.

#### MATERIAL EXAMINED

**Belgium:** 1 ♀, Wesmael coll. (IRSNB). **Germany:** 2 ♂, Ruthe coll. (BMNH); 5 ♀, Oberbayern, Hochstadt, vii.–viii. (*Haeselbarth*) (EH); 1 ♀, Oberbiberg, 2.vii.1969 (*Haeselbarth*) (EH); 1 ♀, Wessling, 7.viii.1972 (*Haeselbarth*) (EH); 1 ♀, Glonn, 14.vii.1968 (*Haeselbarth*) (EH). **Great Britain:** 1 ♀, Hampshire, Havant Thicket, ex *Epinotia fraternella* Douglas on *Abies grandis*, collected 10.xi.1977, emerged iii.1978 (*Langmaid*) (MS); 1 ♀, Essex, Saffron Walden, ix.1966, ex *Coleophora frischella* L. (*Emmet*) (AA); 1 ♀, Yorkshire, Langdale, on *Pinus* (*Day*) (BMNH). **Ireland:** 2 ♀, Co. Down, Tollymore Park, vii.1961 (*Stelfox*) (USNM); 1 ♀, Dublin, Glenasmole, viii.1944 (*Stelfox*) (USNM). **Italy:** 1 ♀, Südtirol, St Peter Ahrntal, viii.1967 (*Haeselbarth*) (EH).

**Hosts.** *Caryocolum fraternella* Douglas (Gelechiidae); *Coleophora frischella* (L.) (Coleophoridae).

**COMMENTS.** This is a very distinctive species, largely characterised by the deeply incurved radius. It seems to be closely related to the following species but there is no possibility of confusing the two.

### *Microdus nugax* Reinhard

(Fig. 54)

*Microdus nugax* Reinhard, 1867: 354. Syntype ♀, GERMANY (MNHU) [examined].

*Agathis nugax* (Reinhard) Shenefelt, 1970: 347.

*Microdus nugax* Reinhard; Tobias, 1971: 260.

♂ ♀, 3.5–4.0 mm (excluding ovipositor).

♀. Very close to *cingulipes* with which it may be compared as follows. Paler part of hind tibia obscurely brownish red with virtually no trace of a darkened, basal ring; hind femur varying from obscurely brownish red to entirely infusate; hind spurs darker.

Head from above slightly less transverse, deeper from back to front. Face polished, convex, virtually impunctate. Ocelli slightly smaller; posterior tangent to anterior ocellus passing freely in front of posterior pair. Preapical segment (3rd) of labial palpus so small as to be virtually absent. Antenna with fewer segments: 23–26; 23 (1), 24 (3), 25 (4), 26 (1). Thorax more elongate. Notaulices characteristically weak, sometimes not or hardly indicated posteriorly. Hind spurs less well developed. Radius only slightly bent but pale along middle stretch (Fig. 54) as in *cingulipes*. Tergite 1 a little less elongate, its sculpture considerably weaker. Ovipositor sheath a little shorter; seen from above, with denser, more closely set hairs that on apical third of sheath do not noticeably project.

♂. Like female except for sexual differences.

#### MATERIAL EXAMINED

**Italy:** 4 ♂, 3 ♀, Südtirol, Algund, 1900 m, 24.vii.1966 (*Haeselbarth*) (EH; 1 ♂, 1 ♀ in BMNH); 2 ♂, 1 ♀, Karthaus, 1200 m, 14.vii.1976 (*Haeselbarth*) (EH); 3 ♂, 2 ♀, Marling, 1200 m, 12.vii.1966 (*Haeselbarth*) (EH; 1 ♂, 1 ♀ in BMNH); 2 ♀, St Peter/Ahrntal, vii.–viii. (*Haeselbarth*) (EH); 1 ♀, Campi, Riva s. Garda, 1400 m, 7.vii.1976 (*Haeselbarth*) (EH).

**Host.** Unknown.

**COMMENTS.** A small, obscurely coloured species, essentially characterised by the weakly developed notaulices and the shape of the radial cell.

### *Microdus eriphyle* sp. n.

(Figs 56, 62, 64)

♀, 4 mm (excluding ovipositor). Black. Hind femur black; hind tibia obscurely whitish yellow, infusate in apical third and with a broad infusate prebasal band.

Head from in front as transverse as in majority of species; seen from above as in Fig. 64. Antennal sockets unusually deep; seen from above frons between sockets very slightly concave. Behind frontal ridge and towards anterior ocellus a very short, almost tuberculiform keel. Ocelli in a high triangle, the posterior tangent to anterior ocellus passing in front of posterior pair. Preapical segment of labial palpus (3rd) well developed, clearly longer than wide. Notaulices deeply impressed throughout, smooth, uniting posteriorly



to form an elongate, smooth furrow. Propodeum appearing smooth, shiny, its sculpture very weak and in one female (paratype) almost absent. Radius of fore-wing strongly incurved but not so much as in *cingulipes* (cf. Fig. 55), evenly pigmented throughout. Outer side of middle tibia with a row of 4 teeth, widely spaced and linking up with 2 at extreme apex of tibia; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus; claws of all legs powerful; lobe almost as long as claw proper, a very deep cleft between it and claw proper (Fig. 54). Gaster unusually long and narrow (Fig. 62). Tergite 1 about twice as long as its apical width, shiny, with a weak, almost shagreened sculpture in which longitudinal elements are virtually absent. Basal half of tergites 2+3 with faint traces of scaly-reticulation distal to the hardly indicated curved furrow common to all species. Ovipositor sheath about as long as gaster plus propodeum; bristle-like hairs towards apex of sheath not different from those elsewhere. Hypopygium long, sharply pointed.

#### MATERIAL EXAMINED

Holotype ♀, **Greece**: Ilia, Olympia, 4–11.vii.1979 (*Day, Else & Morgan*) (BMNH).

Paratype. 1 ♀, same data.

Host. Unknown.

COMMENTS. This is an elegant species, differing in several significant characters from the other *Microdus* species dealt with in this revision. Particularly characteristic is the sculpture of the first gastral tergite. This, and the bend of the radius, suggest some affinity with *Baeognatha* Kokujev but this genus differs in not having a closed areolet in the fore-wing. It is possible that the loss of the second transverse vein in *Baeognatha* is apomorphic and in itself does not preclude a relationship with *Microdus eriphyle*.

### *Microdus linguarius* Nees von Esenbeck

(Figs 32, 66)

*Microdus linguarius* Nees von Esenbeck, 1814: 190. Syntypes, GERMANY (lost).

*Agathis linguarius* (Nees von Esenbeck), Shenefelt, 1970: 340.

*Microdus linguarius* Nees von Esenbeck, Tobias, 1971: 260.

Marshall (1885: 270) was the first reviser of *linguarius* and I have no doubt that his interpretation is correct. Nees von Esenbeck's description is also explicit on the details that define *linguarius*.

♂ ♀, 5.0–5.5 mm (excluding ovipositor).

♀. Black. Basal half of tergites 2+3 frequently marked with reddish; sometimes whole surface reddish except for a large, isolated, elliptical black patch at base; more often pale colouring restricted to a lateral mark on each margin and sometimes whole of tergites 2+3 black. Hind femur red; hind tibia reddish but infuscate on about apical quarter.

Head from in front distinctly lengthened (Fig. 32). Inner margin of each antennal socket produced to form an angular tooth. Antenna with 28–31 segments, usually 30. Preapical segment of labial palpus (3rd) well developed, slightly longer than wide. Notaulices well defined throughout. Sternaulus of usual form. Propodeum coarsely rugose-reticulate all over; in this respect, somewhat uncharacteristic of genus; frequently with 2 indistinct, longitudinal keels. Radius of fore-wing slightly bent inwards towards stigma; areolet triangular or even stalked; stigma shorter than in *clausthalianus* but hardly different from that of *tumidulus*. Prepectal margin strongly raised, with knife-like edge. Outer side of middle tibia with 1–3 isolated teeth in about apical third. Gaster less elongate than in *clausthalianus*, much as in *tumidulus*. Tergite 1 only a little longer than apically wide, finely striated to within about apical third where striations fade and give way to a broad, transverse band of setiferous punctures. Hairs of tergites somewhat characteristically short so that gaster has an almost bare, highly polished appearance. Ovipositor sheath fully 1.25 times longer than body. Hypopygium widely, moderately deeply emarginate at apex; in profile appearing markedly truncate (Fig. 66), rather sparsely hairy.

♂. Antenna with 28–29 segments. Gaster sometimes entirely black. Striation of tergite 1 more variable in intensity than in female, sometimes almost wanting.

#### MATERIAL EXAMINED

**Great Britain**: 1 ♀, Berkshire, Boxmoor, 29–30.vii.1933 (*R. B. Benson*) (BMNH); 1 ♂, Buckinghamshire, Gog Magog Hills, 27.vii.1937 (*R. L. E. Ford*) (BMNH); 1 ♀, Devon, Chudleigh, 14.viii.1935 (*J. F. Perkins*) (BMNH); 1 ♀, Hampshire, Portsdown, 4.viii.1956 (*J. Clark*) (BMNH); 1 ♀, I. of Wight, Cowes, 20.xi.1938 (*R. C. L. Perkins*) (BMNH); 1 ♂, Kent, Shoreham, 15.viii.1958 (*R. L. E. Ford*) (BMNH); 1 ♂, 1 ♀, Surrey, Banstead (*D. Clark*) (BMNH); 49 ♀, Hackhurst Downs, 27–28.viii.1982 (*A. A. Allen*) (AA,

12 in BMNH); 2 ♂, Sussex, Stonecross, 26.vii.1946 (*R. L. E. Ford*) (BMNH). **Hungary:** 1 ♂, 1 ♀, Baranya-megya, Nagyarsane, vii.1963 (*L. Zombori*) (HNHM); 1 ♀, Somberek, 22.vii.1964 (*L. Zombori*) (HNHM); 10 ♀, 3 ♂, Kam, Jeli arboretum (*J. Papp*) (HNHM); 2 ♀, Keszthely, vii.1977 (*J. Papp*); 1 ♂, 1 ♀, Bajánsenye, 16.viii.1977 (*J. Papp*) (HNHM); 1 ♀, Fót.Rét, 16.viii.1960 (*Mihalyi*) (HNHM).

Host. Unknown.

COMMENTS. This is an easily recognised species and is characterised by the relatively elongate head, as seen from in front, the angular projection of the inner margin of the antennal socket and, in the female, especially by the emarginate hypopygium. This last feature is diagnostic for *linguarius* and it is unknown in other species from the region.

Dates of capture for the numerous examples examined indicate that *linguarius* occurs only in July and August; it is probably single brooded.

### *Microdus claushtalianus* (Ratzeburg)

*Ichneumon* (*Microdus*) *claushtalianus* Ratzeburg, 1844a: 25. Holotype ♀, GERMANY (lost).

*Microdus claushtalianus* (Ratzeburg) Ratzeburg, 1844b: 58.

*Agathis claushtalianus* (Ratzeburg) Kloet & Hincks, 1945: 234; Shenefelt, 1970: 326.

*Microdus claushtalianus* (Ratzeburg) Tobias, 1971: 260.

♂ ♀, 6.0–6.2 mm (excluding ovipositor).

♀. Black, rarely with a pale mark against and behind eye. Hind femur always entirely reddish; hind tibia usually same colour except for weak infuscation in apical quarter; but sometimes hind tibia faintly yellowish and contrasting with red femur and, when thus pale, then with faint, prebasal band of infuscation; a pale-coloured hind tibia always correlated with an entirely red hind coxa; hind coxa varying from entirely red to entirely black. Labrum and mandible varying from entirely yellowish to obscure brownish red, or even black (exs. from Sweden: Skåne, Fjellfota sjö).

Face punctate but punctuation variable in intensity; when weak, face more shiny. Antennal sockets almost completely margined behind. Ocelli somewhat variable in size; when largest, they are in a low triangle with posterior tangent to the anterior ocellus touching posterior pair and distance between anterior and posterior ocellus less than diameter of ocellus. Preapical segment of labial palpus (3rd) about as long as wide. Antenna with 37–40 segments in examples with red hind coxa: 37 (4), 38 (7), 39 (4), 40 (2); with 33–36 segments in examples with blackened hind coxa: 33 (1), 34 (1), 35 (5), 36 (1). Mesoscutum somewhat elongate. Notaulices deeply impressed throughout. Sternaulus extending forwards almost exactly to middle of mesopleurum. Radial cell markedly elongate. Outer side of middle tibia with 3–4 teeth in a row. Gaster elongate, more so than in the *tumidulus*-aggregate. Tergite 1 with weak, longitudinal striation which is frequently so weak as to be almost absent. Ovipositor sheath fully as long as body.

♂. Like female except for sexual differences.

#### MATERIAL EXAMINED

**Germany, Great Britain, Holland, Ireland.**

Host. *Epiblema scutulana* (Denis & Schiffermüller) (Tortricidae) (1 ♀, ex stem of *Cirsium*, 17.iv.1979 (*P. R. Sokoloff*) (MS); 1 ♀, Berwick, Oxtun, ex stem of thistle sp., 10.iii.1979 (*K. Bland*) (MS)).

COMMENTS. Most specimens of *claushtalianus* are fairly easily recognised by their slender form and long ovipositor. Smaller examples are sometimes hard to separate from *tumidulus* (s.l.). A prolonged study of both species has failed to reveal the limits of the range of variation in either.

### *Microdus tumidulus* Nees von Esenbeck

(Fig. 58)

*Microdus tumidulus* Nees von Esenbeck, 1814: 189. Syntypes, GERMANY (lost).

*Microdus tegularis* Thomson, 1895: 2231. LECTOTYPE ♀, SWEDEN: Palsjö (ZI), here designated [examined]. **Syn. n.**

*Agathis tumidulus* (Nees von Esenbeck) Shenefelt, 1970: 362.

*Microdus tumidulus* Nees von Esenbeck; Tobias, 1971: 260.

This species is very like *claushtalianus*. The main differences between the two species have been given in the key; there is very little to add.

♀. Hind coxa mostly black, rarely entirely red. Antennal sockets unmargined behind; surface between sockets virtually smooth except for a weakly impressed, median, longitudinal groove. Antenna with 27–30

segments. Sternaulus ending at middle of mesopleurum. Hind femur stouter than in *clausthalianus*, 3 times as long as greatest width; outer side of middle tibia with 2–4 teeth towards apex, in addition to small cluster of teeth at extreme apex. Fore-wing (Fig. 58). Ovipositor sheath equal to length of gaster plus propodeum. ♂. Like female except for sexual differences.

#### MATERIAL EXAMINED

France, Germany, Great Britain, Greece, Ireland, Italy, Yugoslavia.

HOST. *Dichrorhampa acuminatana* (Lienig & Zeller) (Tortricidae). Reinhard (1867: 354) records *tumidulus* as having been bred from the pupae of this moth (under the name *Phthoroblastis acuminatana*) in August on *Chrysanthemum leucanthemum* L.

COMMENTS. This species, which may be an aggregate, has been correctly interpreted (s.l.) by all major workers on *Microdus*. It is easily recognised by the pale mark behind the eyes – a striking example of constancy in a colour-character.

The notes given above cover the majority of the specimens examined, including Thomson's *tegularis*. There is, however, a series of 13 specimens in BMNH that, in certain respects, are intermediate between *tumidulus* and *clausthalianus*. On the whole the habitus is more slender than that of typical *tumidulus* and the ovipositor is longer, almost as long as the whole body. The antennal sockets are sometimes completely margined behind, sometimes smooth and evenly hollowed out; the surface between the sockets is usually raised in the form of an evenly rugose platform but more often the surface here is weakly bipartite, being divided by a feeble channel. Antenna with 29–33 segments. The material is from the following localities. Germany: 4 ♀, Ruthe coll. (BMNH). Great Britain: 1 ♀, Surrey, Banstead, 29.vi.1952 (BMNH); 1 ♀, Hampshire, Stockbridge, 15.vi.1953 (R. L. E. Ford) (BMNH). France: 1 ♀, Pyrénées-Orientales, Vernet-les-Bains, 20.vi.1963 (BMNH). Sweden: 1 ♀, Skåne, Silvakra, viii.1976 (T. Huddleston & J. Quinlan) (BMNH); 4 ♀, Upsala, Solna, viii.1976 (T. H. & J. Q.) (BMNH); these last mentioned 4 specimens have the hind tarsus markedly blackened and the area between the antennal sockets showing maximum rugosity. Switzerland: 1 ♀, St Gall, Lake Zürich, ix.1951 (BMNH).

### *Microdus conspicuus* Wesmael

(Figs 30, 61)

*Microdus conspicuus* Wesmael, 1837: 17. LECTOTYPE ♀, BELGIUM: Brussels, Wesmael coll. (IRSNB), here designated [examined].

*Microdus arcuatus* Reinhard, 1867: 353. Syntype ♂, GERMANY (MNHU) [examined]. **Syn. n.**

*Earinus zonatus* Marshall, 1885: 268. Syntypes, GREAT BRITAIN (lost). [Synonymised by Lyle, 1920: 184.]

*Agathis conspicua* (Wesmael) Muesebeck & Walkley, 1951: 119.

*Microdus conspicuus* Wesmael; Tobias, 1976b: 98.

♂ ♀, 5.0–5.5 mm long (excluding ovipositor). Black; greater part of gaster bright reddish yellow. Legs almost entirely reddish yellow; hind coxa black; hind femur entirely reddish yellow. Antenna of ♀ pale beneath on more than basal half. In the male, base of tergites 2+3 sometimes with a blackened patch, and three apical tergites may also be darkened.

♀. Head in facial view strongly transverse. Third segment of labial palpus hardly discernible. Antenna with 34–35 segments. Notaulices deeply impressed throughout. Sternaulus rugose. Propodeum usually with two discernible keels but these usually obscured by coarse rugosities. Radius of fore-wing markedly bent inwards towards stigma and here tending to be colourless (Fig. 61); areolet sharply triangular and often with conspicuous stalk. Outer side of middle tibia in apical half with group of 5–8 thick teeth; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus. Gaster as in *tumidulus*. Tergite 1 about 1.33 times longer than its apical width; finely, evenly striate all over, the surface appearing very shiny; basal half of tergites 2+3 sometimes with traces of fine rugose-striation tending to be concentric around the feebly raised, transverse, basal swelling. Apical sternite (hypopygium) evenly pointed at apex. Ovipositor sheaths a little shorter than body.

♂. Gaster somewhat darker than in female. Sometimes eye-orbits, both on inner side and temples, paler in colour.

#### MATERIAL EXAMINED

Belgium, Finland, France, Great Britain, Hungary, Ireland, Italy, Sweden, Switzerland.

HOSTS. Shenefelt (1970) lists the following: *Conchylis nitidulana* Zeller (?? *Gypsonoma nitidulana* Lienig & Zeller) (Tortricidae); *Pammene regiana* (Zeller) (Tortricidae); *Cydia molesta* Busck (Tortricidae), a



species which, according to Meyrick (1968: 590) has been introduced into North America, Australia and Europe.

Bred specimens from *Cydia pomonella* (L.), *Pammene regiana* (Zeller) and *Rhopobota ustomaculana* (Curtis) (all Tortricidae) have been examined. It seems that Tortricidae are the main, if not the only, hosts.

COMMENTS. This species has some economic importance because of its parasitism on *Cydia pomonella* the Codling moth. As a species it is chiefly characterised by its bright colour and bent radius. Nevertheless, it bears a strong superficial resemblance to *zaykovi* but the latter has a differently shaped head, both in facial view and profile.

### *Microdus zaykovi* sp. n.

♂ ♀, 4.5–5.0 mm (excluding ovipositor). Black. Gaster, except for 1st tergite, reddish yellow but surface becoming slightly infusate on posterior half in the paratype. Hind coxa black; hind femur red; hind tibia hardly paler than hind femur and faintly darkened only at extreme apex. Wings deeply infusate.

♀. Head in facial view like that of *linguarius* (cf. Fig. 32); in lateral view, hind margin of head deeply hollowed out at a point level with lowest point of eye; in same view of head, cheeks behind markedly angled. Surface between antennal sockets virtually flat; no trace of a projection on inner side of antennal socket as in *linguarius*. Antennal scrobes broader than in *linguarius*, reaching close to inner eye-margin and much closer to posterior ocellus. Posterior tangent to the anterior ocellus passing far in front of posterior pair in the paratype; almost touching them in the holotype. Mesoscutum and notaulices of ordinary form. Sternaulus reaching middle of mesopleurum. Radius of fore-wing slightly more strongly curved inwards towards stigma than in *linguarius*, with stigma more narrowed towards apex and radial cell slightly longer than in that species. Outer side of middle tibia with one tooth at extreme apex in holotype, just behind the 2–3 closely spaced teeth at the edge; no preapical teeth in the paratype; hind tarsus with apical lobe smaller than in *linguarius*, the claw itself hence appearing longer and less curved. Gaster rather short and broad; tergite 1 considerably widened towards apex, about 1.25 times longer than its apical width; on posterior half almost smooth and polished in the two females available. Hypopygium not emarginate at apex and in profile angled at about 60 degrees. Ovipositor sheath much shorter than in *linguarius*, hardly as long as thorax and gaster combined.

♂. Like the female in all essential details but apical half of gaster blackened. In one of the two paratypes, there is a large pale oblong spot behind the eye (much as in *tumidulus*). Colour probably variable.

#### MATERIAL EXAMINED

Holotype ♀, **Bulgaria**: Rhodope, Nikolovo, 19.viii.1976 (*Zaykov*) (ZC).

Paratypes. **Bulgaria**: 1 ♀, Rhodopi, 'h.Ruen', 29.vii.1960 (*A. Germanov*) (BMNH); 1 ♂, Nikolovo, 15.viii.1976 (*Zaykov*) (ZC); 1 ♂, Bojno, 24.vii.1975 (*Zaykov*) (ZC).

COMMENTS. The most characteristic feature of this very dark-winged species is the hollowing out of the back of the head when this is seen in profile. In colour it bears a superficial resemblance to *conspicuus* under which the differences are pointed out.

### *EARINUS* Wesmael

*Earinus* Wesmael, 1837: 8. Type-species: *Microdus nitidulus* Nees von Esenbeck (= *elator* (Fabricius)), by subsequent designation (Muesebeck & Walkley, 1951: 116).

DIAGNOSIS. Head in facial view not lengthened, like that of *Microdus*. Third segment of labial palpus virtually twice as long as wide. Ocelli in low triangle; posterior tangent to anterior ocellus cutting posterior pair. Notaulices absent but mesoscutum behind with elongate furrow. Sternaulus absent. First discoidal cell separated from 1st cubital cell by a fully pigmented, sclerotised vein; areolet of fore-wing 4-sided. Outer side of middle tibia with row of 4–6 teeth; outer side of front tibia with at least one tooth. Metasternum behind not completely surrounding hind coxal insertion. Ovipositor in the three species under consideration not longer than gaster plus propodeum.

#### Key to species (females)

- 1 Head and thorax densely hairy; face strongly, conspicuously punctate, somewhat flattened on each side of a broad, longitudinal ridge; mesoscutum usually black but sometimes reddened *elator* (Fabricius) (p. 227)
- Head and thorax with ordinary pubescence; face shiny and at most with fine punctation; a longitudinal, facial ridge hardly indicated .....

- 2 Ovipositor sheath two-thirds as long as gaster; hairs of ovipositor sheath longer, thicker, more bristly ..... *transversus* Lyle (p. 228)  
 – Ovipositor sheath about as long as gaster plus propodeum; hairs of ovipositor sheath shorter, thinner, less bristly ..... *gloriorius* (Panzer) (p. 227)

***Earinus elator* (Fabricius)**

*Banchus elator* Fabricius, 1804: 128. Lectotype ♂, AUSTRIA (ZM), designated by Fitton, 1985 [examined].

*Microdus nitidulus* Nees von Esenbeck, 1814: 187. Syntypes, GERMANY (lost). **Syn. n.**

*Microdus thoracicus* Nees von Esenbeck, 1834: 143. Syntypes, GERMANY (lost). **Syn. n.**

*Earinus nitidulus* (Nees von Esenbeck) Reinhard, 1867: 351.

*Earinus thoracicus* (Nees von Esenbeck) Shenefelt, 1970: 407.

♂ ♀, 7–8 mm long (excluding ovipositor).

♀. Black but mesoscutum sometimes reddened. Legs entirely red except for infusate hind tarsi. At least the two apical segments of maxillary palpus yellowish.

Head characteristically clothed with long pubescence. Face conspicuously punctate, the punctures tending to be separated by slightly less than their diameter. Antennal sockets united on inner side to form a raised, hump-like area, densely punctate. Scrobes with some rugose-punctuation. Antenna with 36–40 segments. Thorax densely hairy. Mesoscutum sharply, distinctly punctate. Mesopleurum closely, sharply punctate, thickly pubescent over almost entire surface. Propodeum at middle with 2–3 very irregular, longitudinal keels; surface on each side of keels tends to be smooth and polished. Areolet of fore-wing subquadrate, large, frequently with extra vein in form of stub arising from middle of outer side of 2nd cubital vein; distal abscissa of postmarginalis about 0.5 times as long as proximal abscissa. Outer side of middle tibia with 3–4 teeth arranged in row; front tibia with 4–5 teeth along outer side; inner spur of hind tibia slightly less than half as long as basal segment of hind tarsus. Gaster, except for tergite 1 which is vaguely rugose-punctate to rugose-striate, highly polished and only very sparsely hairy; ventral surface and laterotergites by contrast thickly hairy. Ovipositor sheaths about as long as gaster plus propodeum, densely beset with thick, bristle-like setae.

♂. Like female except for sexual differences.

**MATERIAL EXAMINED**

**Austria:** 2 ♂ (including lectotype), Fabricius coll. (ZM), **Germany:** 3 ♂, 2 ♀, Ruthe coll. (BMNH); 2 ♀, Celle, 23.v.1942 (BMNH). **Great Britain:** 1 ♀, Berkshire, Woolhampton, ex *Agrochola lota* Clerck, coll. 30.v.1978, em. 22.iv.1979 (*M. Shaw*) (MS); 1 ♀, Devon, Dartmoor, 23.iv.1924 (*J. F. Perkins*) (BMNH); 2 ♀, Newton Abbott, 28.iv.1928 (*R. C. L. Perkins*) (BMNH); 1 ♀, Tiverton (*F. H. Lyon*) (BMNH); 2 ♀, Hertfordshire, Brickett Wood, 24.iv.1948 (*R. B. Benson*) (BMNH), 1 ♂, Aldbury, 2.iv.1949 (*R. B. Benson*) (BMNH); 2 ♀, Lancashire, nr Nutford, Hawes Wood, ex *Agrochola circellaris* (Hufnagel) in *Salix* catkins, coll. 7.iv.1977, em. 19.iii.1978 (*M. Shaw*) (MS); 1 ♂, Shropshire, Church Stretton (*D. K. McKeven*) (BMNH); 8 ♂, 5 ♀, Surrey, Salfords, beaten from privet (*Ligustrum*), 15.iii.1981 (*A. A. Allen*) (AA; BMNH); 1 ♂, 3 ♀, Sussex, Plaistow, King's Park Wood, ex *Agrochola lota* Clerk on *Salix caprea*, coll. 20.v.1978, em. 19.iv.1979 (*M. Shaw*) (MS); 1 ♀, Sussex (no other loc.), ex *Orthosia xerampelina* Hübner (BMNH); 2 ♀, Lothian, Edinburgh, 16.iv.1981 (BMNH). **Ireland:** 1 ♂, Dublin, Glenasmole, 5.iv.1936 (*Stelfox*) (USNM); 1 ♂, Wicklow, Glencullen, 25.iii.1932 (*Stelfox*) (USNM). **Sweden:** 2 ♀, Skåne, 28–30.iv.1938 (*Perkins*) (BMNH).

**Hosts.** *Agrochola circellaris* (Hufnagel); *Agrochola lota* Clerck on *Salix caprea*; *Atethmia centrigo* (Haworth) (all Noctuidae). The stout cocoon of the parasite is barrel-shaped, white, papery. All the above records indicate that *elator* is single-brooded and occurs from March to May.

**COMMENTS.** This is a very distinct species on account of its unusual hairiness and the thick setae of the female ovipositor sheaths. Females with a red mesoscutum are particularly easy to recognise.

***Earinus gloriorius* (Panzer)**

(Figs 67, 68)

*Bassus gloriorius* Panzer, 1809: 102. Syntypes, GERMANY (lost).

*Microdus ochropes* Curtis, 1829: 105. Nomen nudum. [See *ochropes* Lyle, 1920.]

*Microdus gloriorius* (Panzer) Haliday, 1833: 263. [First reviser.]

*Earinus gloriorius* (Panzer) Haliday in Westwood, 1839: 63.

*Microdus affinis* Wesmael, 1837: 11. LECTOTYPE ♀, BELGIUM: Brussels, Wesmael coll. (IRSNB), here designated [examined]. [Synonymised by Marshall, 1885: 267.]



- Microdus varicoxis* Wesmael, 1837: 10. LECTOTYPE ♀, BELGIUM: Brussels, Wesmael coll. (IRSNB), here designated [examined]. **Syn. n.**
- Microdus delusor* Wesmael, 1837: 12. LECTOTYPE ♀, BELGIUM: Brussels, Wesmael coll. (IRSNB), here designated [examined]. **Syn. n.**
- Microdus tuberculatus* Wesmael, 1837: 13. LECTOTYPE ♀, BELGIUM: Brussels, Wesmael coll. (IRSNB), here designated [examined]. **Syn. n.**
- Agathis bicingulatus* Thomson, 1895: 2234. LECTOTYPE ♀, SWEDEN: Örtöfta, Thomson coll. (ZI), here designated [examined]. **Syn. n.**
- Earinus ochropes* Lyle, 1920: 248. LECTOTYPE ♀, GREAT BRITAIN (Dale) (UM), here designated [examined]. [Attributed to Curtis, 1829.] **Syn. n.**

♂ ♀, ca 5 mm (excluding ovipositor).

♀. Black. Hind coxa almost always red, sometimes bicoloured, rarely entirely black; hind tibia sometimes yellowish with infusate apex and infusate basal ring; more often reddish throughout. Face smooth, shining, rarely with traces of punctation towards antennal insertions. Antennal scrobes polished, smooth. Antenna with 32–36 segments. Mesoscutum with only moderately thick pubescence. Virtually no trace of notaulices but usually mesoscutum with a longitudinal furrow posteriorly. Prepectal margin almost obliterated medially. Propodeum on the whole smooth, shining and with two longitudinal keels of variable strength; lateral panels sparsely hairy. Areolet of fore-wing always distinctly 4-sided; usually somewhat narrowed towards stigma (Figs 67, 68); rarely more obviously quadrate and with an accessory vein arising from middle of outside of 2nd transverse cubitus as in *elator*. Claws of hind tarsus more strongly bent than in *elator* and with deeper lobe; middle tibia with 3–4 teeth on outer side; fore tibia with 3–4 teeth on outer side. Tergite 1 about 1.33 times longer than its apical width; vaguely sculptured on apical half but sculpture varying much in intensity. Tergites 2+3 with variable sculpture; at base usually with a more or less distinct, transversely triangular area that is slightly raised and generally smooth and shining; distal to this area and as far as second suture, the amount of sculpture is highly variable; sometimes it appears as fine rugosity, sometimes as rugose-striation; sometimes whole of tergites 2+3 entirely smooth. Ovipositor sheath about as long as gaster plus propodeum; its setae much less thickened than in *elator* and, towards apex, shorter, finer and more adpressed.

♂. Like female except for sexual differences.

#### MATERIAL EXAMINED

**Belgium, Germany, Great Britain, Holland, Hungary, Ireland, Sweden, Switzerland.**

Host. *Agonopteryx ciliella* (Stainton) or *Agonopteryx heracliiana* (L.) (Oecophoridae) on *Angelica sylvestris* L. (MS).

COMMENTS. *Earinus gloriatorius* is an abundant species but shows a confusing variation in the colour of the hind legs and the rugosity of the gaster. Like *elator*, with which it could not be confused, it occurs in spring. Wesmael's three species synonymised above and about whose separate validity he had some misgivings are recorded by him as having been captured towards the end of April.

#### *Earinus transversus* Lyle

*Earinus transversus* Lyle, 1920: 249. LECTOTYPE ♀; GREAT BRITAIN (Dale) (UM), here designated [examined].

♀, 6.5 mm long (excluding ovipositor). Black. Hind coxa and hind femur red; hind tibia bright yellow, deeply infusate in apical third and with faint post-basal infusate spot; hind tarsus deeply infusate throughout.

Face smooth, shining, finely punctate. Antennal scrobes polished. Antenna with 38 segments. Pubescence of mesoscutum thicker than in *gloriatorius* but less so than in *elator*. Mesoscutum with some vague, indistinct punctation. No trace of notaulices. Propodeum shorter than in *gloriatorius*, with denser pubescence, more even and somewhat characteristically directed backwards; lateral panels appearing duller because of fine punctation. Areolet of fore-wing markedly 4-sided, narrowed towards stigma. Front tibia with a single tooth on outer side; middle tibia with 3 teeth on outer side; hind claw much as in *elator*, less bent than in *gloriatorius*. Tergite 1 about 1.25 times longer than its apical width, with shining, indefinite sculpture much as in *gloriatorius*. Tergites 2+3 shining, with rather coarse, variable rugosity extending virtually to apex of segment; at base with weakly defined, transverse, subtriangular area. Ovipositor sheath 0.66 times as long as gaster, beset with bristly hairs, thicker than in *gloriatorius* and almost as thick as those of *elator*.



## MATERIAL EXAMINED

**Great Britain:** 1 ♀ (lectotype), 'type', 'ex Polycommata', Dale coll. (UM); 1 ♂, 'type', Dale coll. (UM); 1 ♀, 'cotype', '1899' Dale coll. (UM); 1 ♂, 'cotype', Dale coll. (UM).

**HOST.** The label 'ex Polycommata' may refer to *Trichopteryx polycommata* (Denis & Schiffermüller) (Geometridae).

**BAEOGNATHA** Kokujev

*Baeognatha* Kokujev, 1903: 243. Type-species: *Baeognatha turanica* Kokujev, by monotypy.

*Camptothlipsis* Enderlein, 1920: 166. Type-species: *Camptothlipsis costalis* Enderlein, by original designation. [Synonymised by Tobias, 1976a: 214.]

**DIAGNOSIS.** Head in facial view like that of *Microdus*, transversely elliptical. Surface between antennal insertions slightly raised in the form of a weak hump or tubercle in longitudinal direction or simply rounded from back to front. Mouth parts not lengthened. Notaulices distinct throughout. Sternaulus very distinct. Outer side of middle tibia with at least 2 teeth remote from apical margin; inner spur of hind tibia not reaching middle of basal segment of hind tarsus; claws lobed. Areolet of fore-wing open (Fig. 60). Tergite 1 and basal half of tergites 2+3 with or without sculpture. Ovipositor at least as long as gaster.

The genus is typically *Microdus*-like in habitus but differs essentially in that the 2nd submarginal cell is not closed externally by a vein ( $r-m$ ) so that an areolet is absent. *Microdus eriphyle* approaches *Baeognatha* in the kind of sculpture on the basal tergites of the gaster.

**Key to species (females)**

- 1 Ovipositor sheath about as long as gaster; basal segment of hind tarsus slightly shorter than following segments together; hind femur blackish..... *nigra* Telenga (p. 230)
- Ovipositor sheath about as long as body; basal segment of hind tarsus distinctly longer than following segments together; hind femur bright yellow..... *armeniaca* Telenga (p. 229)

***Baeognatha armeniaca* Telenga**

(Fig. 60)

*Baeognatha armeniaca* Telenga, 1955: 300. Holotype ♀, U.S.S.R.: Armenia (AS) [not examined].

♀, 4 mm long (excluding ovipositor). Head mainly bright yellowish. Thorax variable in colour but with much pale marking; sometimes only mesoscutum and pronotum pale with rest of thorax infusate. Gaster varying from entirely reddish yellow (except tergite 1) to almost black. Legs bright reddish yellow except for hind coxa which may show darkening at base. Wings virtually hyaline; medius colourless proximal to basalis.

Head in facial view transverse, only very weakly narrowed towards mouth. Face smooth, shining. Between antennal sockets a smooth, blunt keel. Preapical segment (3rd) of labial palpus very small, hardly longer than wide. Ocelli in rather low triangle with posterior tangent to anterior ocellus virtually touching posterior pair. Notaulices deeply impressed throughout. Sternaulus deeply impressed, reaching posterior corner of mesopleurum. Propodeum coarsely rugose-reticulate with only the faintest indication of two broken, longitudinal keels. Distal abscissa of postmarginalis about 1.5 times longer than proximal abscissa (Fig. 60). Outer side of middle tibia with 1–2 teeth at middle and two close teeth at apex; inner spur of hind tibia not quite reaching middle of basal segment of hind tarsus; basal segment of hind tarsus distinctly longer than remaining segments together, 6:5; claws small, with large, basal lobe. Tergite 1 about twice as long as apically wide, with a dull, even sculpture of scaly-reticulation, the surface having almost a shagreened appearance with only a few weak, longitudinal ridges towards sides. Basal half of tergites 2+3 with a sculpture similar to that of tergite 1 but weaker and more vague; rest of gaster polished, shining. Ovipositor sheath about as long as body, less head.

## MATERIAL EXAMINED

**Austria:** 1 ♀, Neusiedlersee, 20.viii.1960 (*G. J. Kerrich*) (BMNH). **Turkey:** 1 ♀, Ankara, Kavaklidere, 6.viii.1960 (*Guichard & Harvey*) (BMNH). **U.S.S.R.:** 3 ♀, ? Armenia, ex *Anarsia eleagnella* Kuznetsov (AS; one in BMNH).

**HOSTS.** *Anarsia eleagnella* Kuznetsov (Gelechiidae); *Cydia funebrana* Treitschke (Tortricidae); *Recurvaria nanella* (Denis & Schiffermüller) (Gelechiidae). These records from Tobias (1976: 214).

**COMMENTS.** This species is included on the strength of the single female recorded above from Austria. It differs from the more eastern specimens in being a little larger and much darker in colour, the head being mainly reddish yellow with darkened occiput and a dark patch in the middle of the face; the thorax and

gaster above are entirely blackened and the hind coxa is pale only on the apical third; the relation between length of basal segment of hind tarsus and combined length of remaining segments has not been checked because the legs are broken.

The specific differences between *armeniaca* and *nigra* have been given in the key.

### *Baeognatha nigra* Telenga

*Baeognatha nigra* Telenga, 1955: 300. Syntypes ♀, U.S.S.R. (AS) [not examined].

The interpretation of this species is based on a single female, identified by Tobias and borrowed from him.

♀, 3 mm long (excluding ovipositor). Black. Inner orbits brownish yellow, the yellow colour reaching antennal sockets. Hind femur infusate; hind tibia infusate on apical third, with faint, dark ring near base; hind coxa blackish.

Head in facial view slightly more narrowed below than in *armeniaca*. Face smooth, shining. Between antennal sockets a smooth, blunt ridge as in *armeniaca*. In dorsal view head slightly less transverse than in *armeniaca*. Antenna broken in both examples. Notaulices and sternaulus as in *armeniaca*. Radial cell slightly narrower than in *armeniaca*; distal abscissa of postmarginalis only slightly longer than proximal abscissa. Teeth of middle tibia and spur of hind tibia as in *armeniaca*; basal segment of hind tarsus slightly shorter than following segments together, 9:11. Gaster slightly less elongate than in *armeniaca* but sculpture of tergite 1 and basal half of tergites 2+3 similar, though that on tergites 2+3 is sharper and better defined than in *armeniaca* and the curved furrow is slightly deeper and more distinct. Ovipositor as long as gaster.

#### MATERIAL EXAMINED

U.S.S.R.: 1 ♀, Kazakhstan, Urals, Ganvartsjevo (AS). France: 2 ♀, Mulhouse, Bois de Nonnenbruch, vi. 1977, ex larvae of *Coleophora* ? *flavipennella* (Duponchel) on *Quercus* (S. E. Whitbread) (BMNH).

Hosts. *Coleophora* ? *flavipennella* (Duponchel). The cocoon of the parasite is spun within the case of the host.

The distributional data on this species are scant but suggest that *Baeognatha nigra* is widespread.

### Species inquirendae

Type-material of the following species is not available for examination.

*Microdus abbreviator* Ratzeburg, 1852: 45.

*Microdus brevicaudis* Reinhard, 1867: 356.

*Microdus cingulator* Ratzeburg, 1852: 46.

*Agathis initiator* Fonscolombe, 1846: 40.

*Vipio insularis* Snellen van Vollenhoven, 1873: 192.

*Agathis major* Fonscolombe, 1846: 39.

*Ichneumon purgator* Fabricius, 1793: 156.

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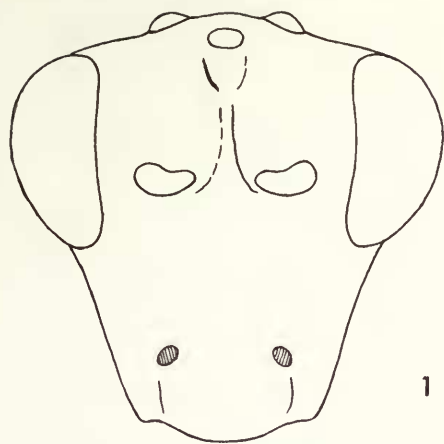
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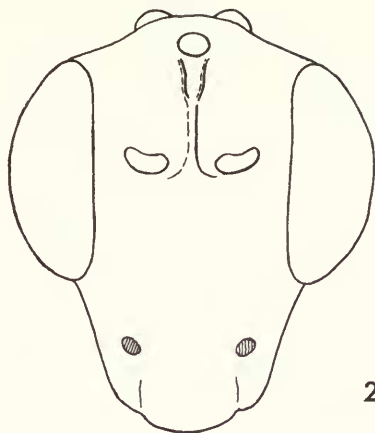
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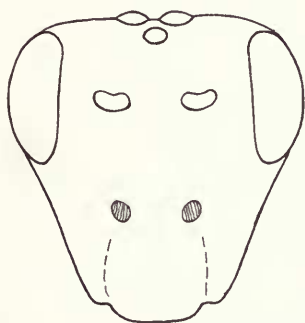
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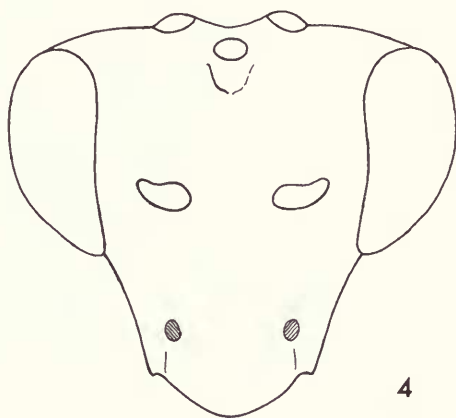
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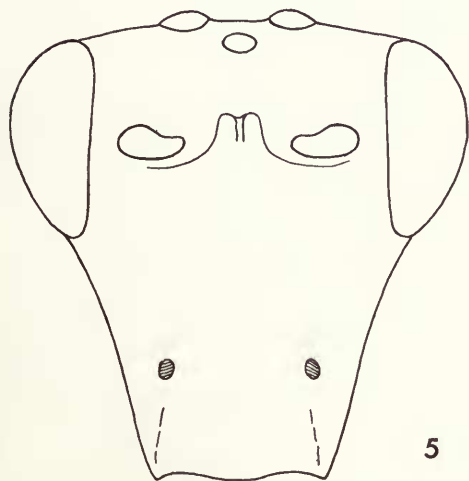
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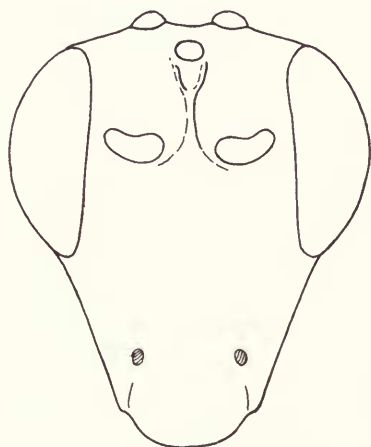
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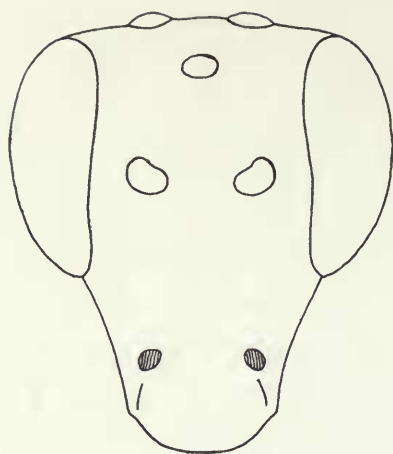


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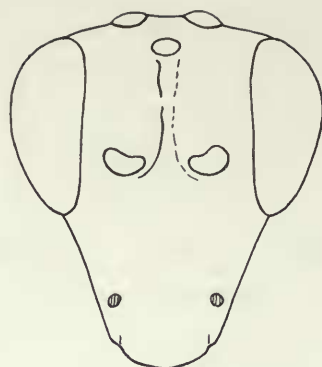


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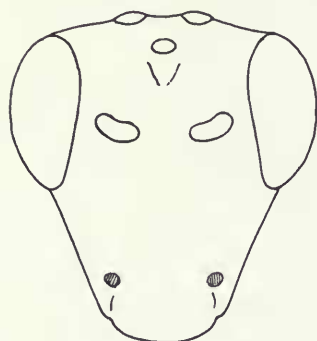
Figs 1–6 *Agathis* species, heads in facial view. 1, *ariadne* ♀; 2, *assimilis* ♀; 3, *glaucoptera* ♀; 4, *malvacearum* ♀; 5, *syngenesiae* ♀; 6, *anchisiades* ♀.



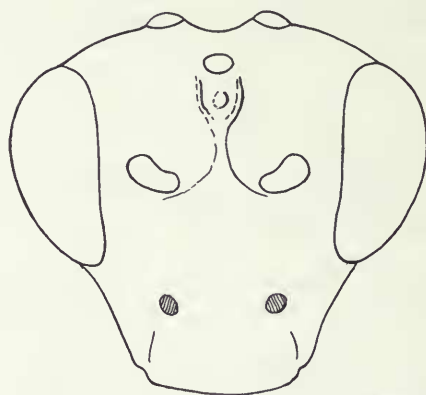
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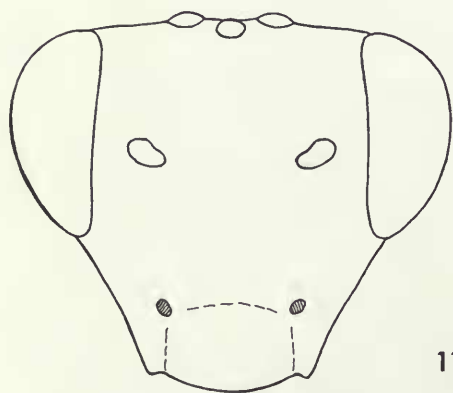
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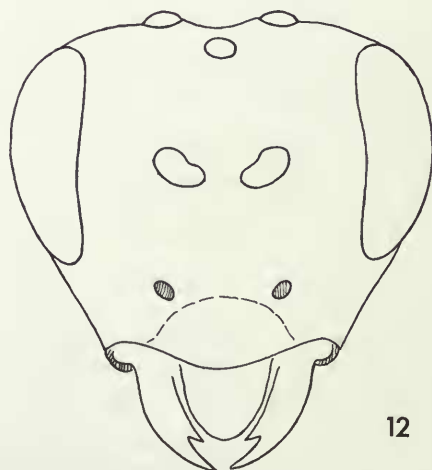
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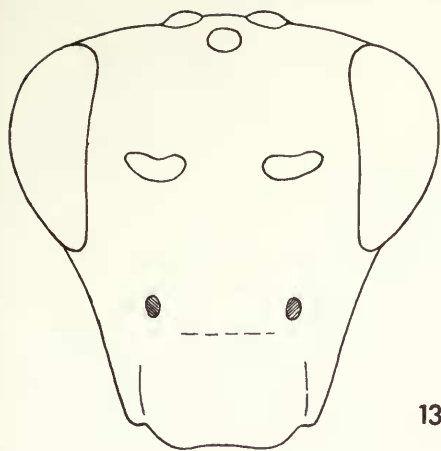
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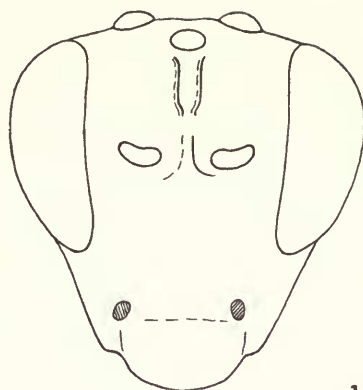
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**Figs 7–12** *Agathis* species, heads in facial view. 7, *zaykovi* ♀; 8, *polita* ♀; 9, *montana* ♀; 10, *fulmeki* ♀; 11, *nigra* ♀; 12, *pappei* ♀.

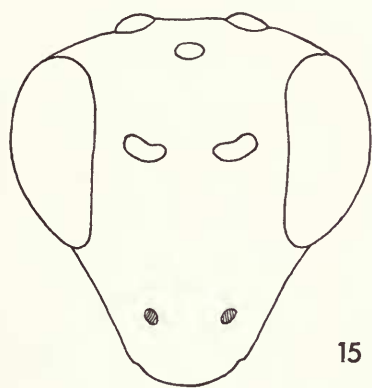




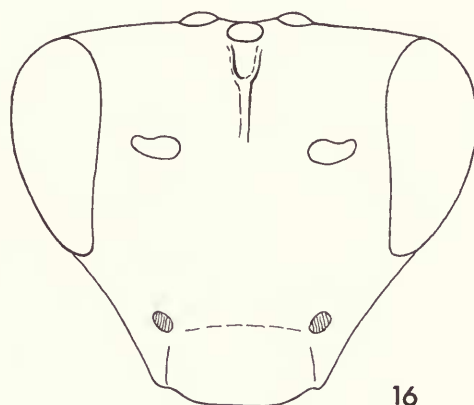
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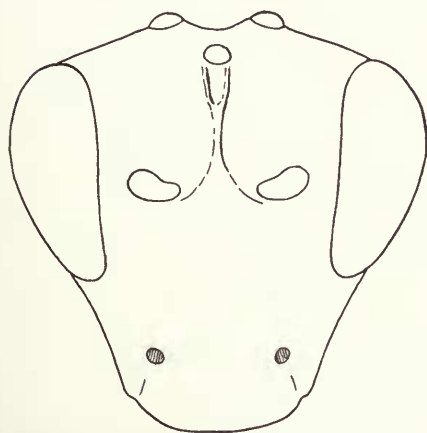
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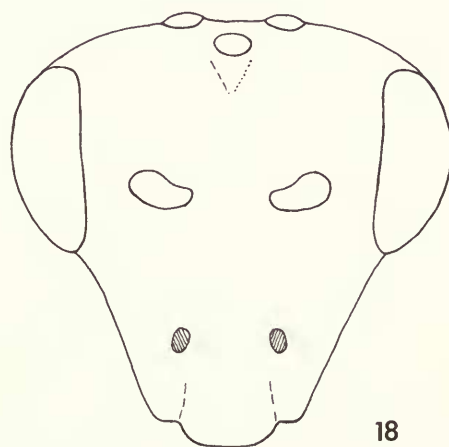
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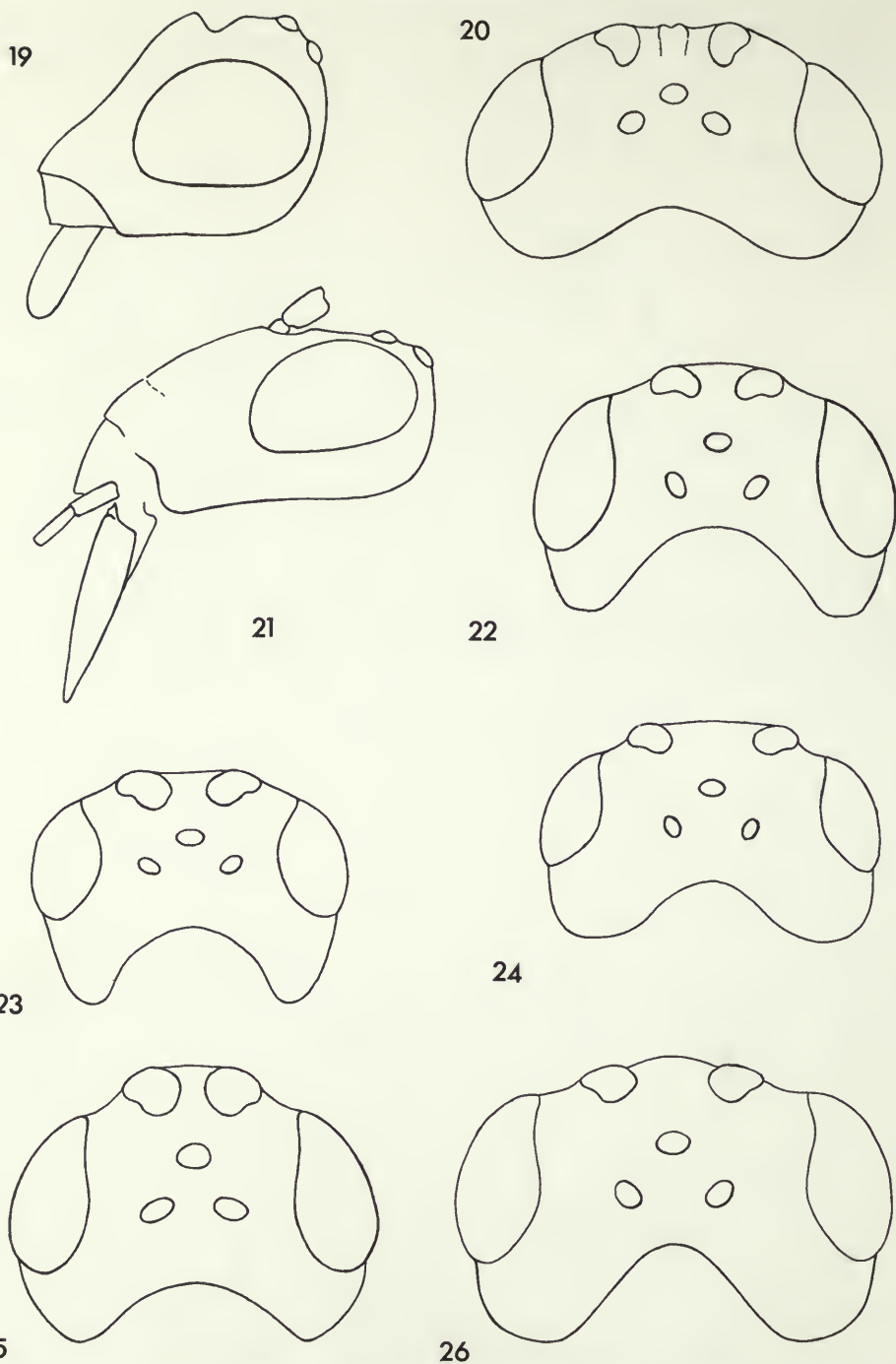


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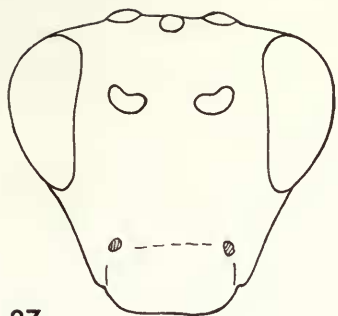


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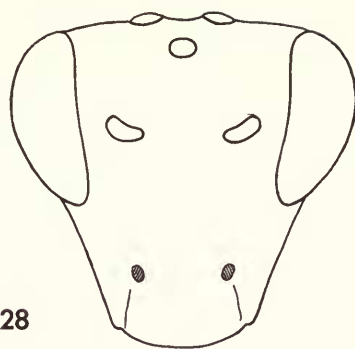
Figs 13–18 *Agathis* species, heads in facial view. 13, *semiaciculata* ♀; 14, *achterbergi* ♀; 15, *pedias* ♀; 16, *varipes* ♀; 17, *rufipalpis* ♀; 18, *anglica* ♀.



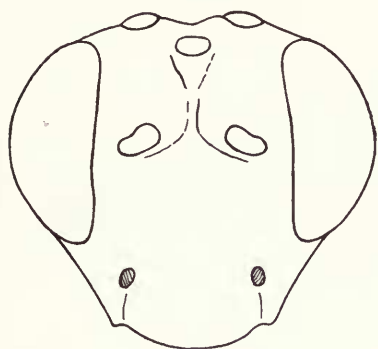
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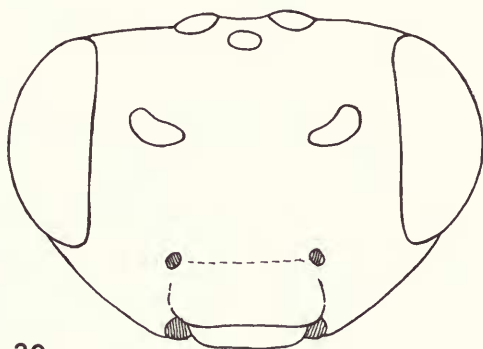
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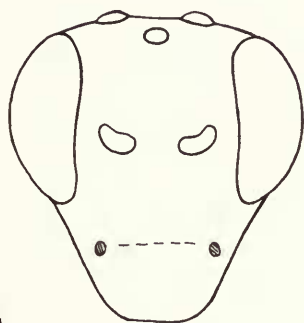
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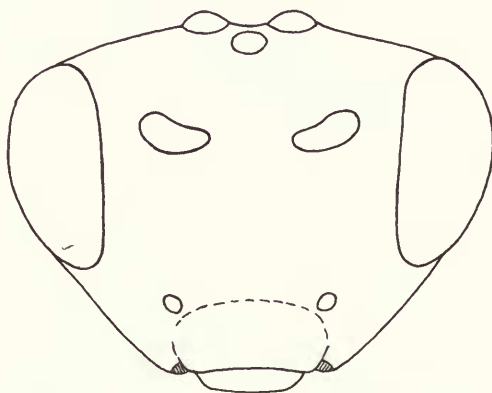
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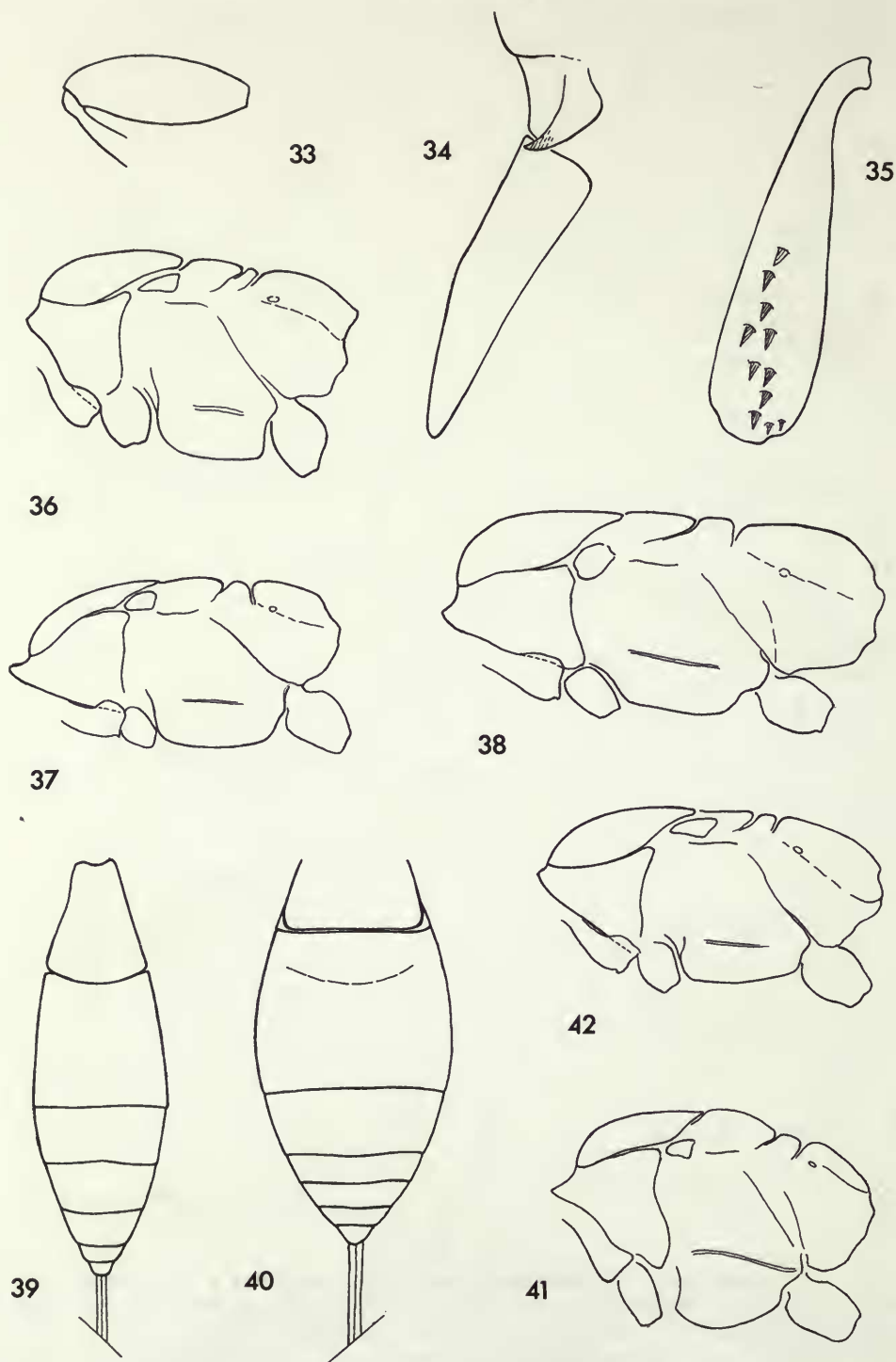
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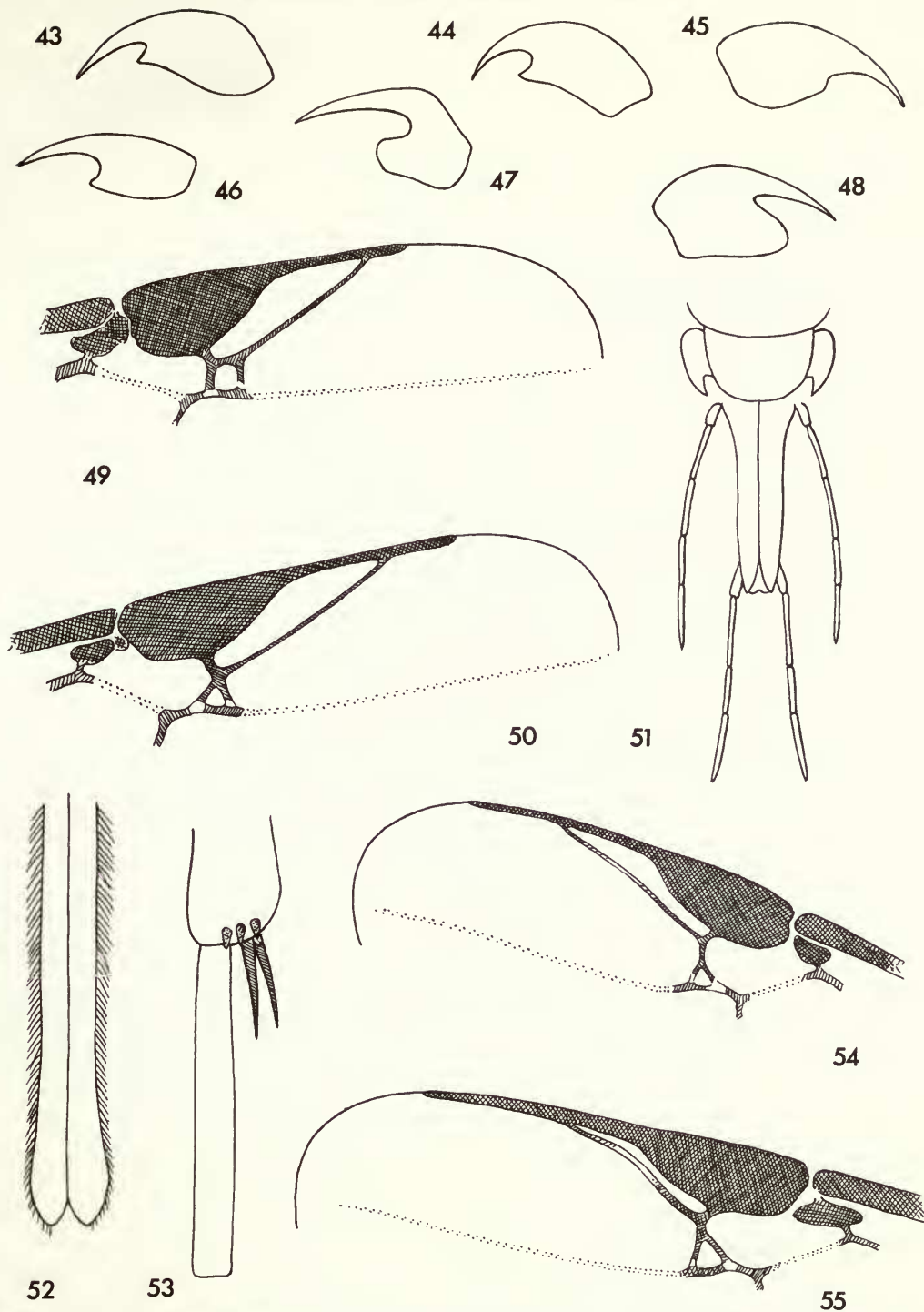
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**Figs 27–32** 27–29, *Agathis* species, heads in facial view. (27) *meridionellae* ♀; (28) *glabricula* ♀; (29) *minuta* ♀. 30, *Microdus conspicuus* ♀, head, facial; 31, *Agathis asteris* ♀, head, facial; 32, *Microdus linguarius* ♀, head facial.

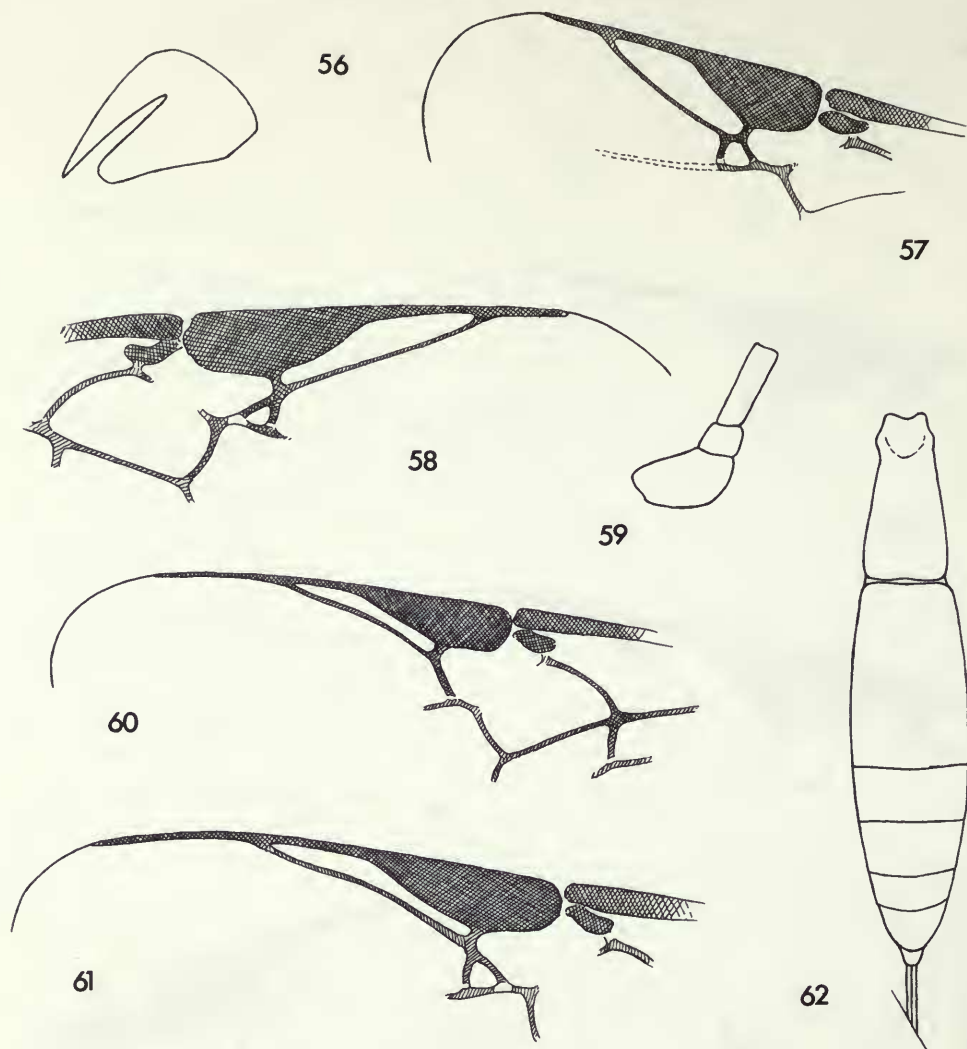




**Figs 33–42** *Agathis* species. 33, *tibialis* ♀, hind femur; 34, *zaykovi* ♀, galea; 35, *fulmeki* ♀, mid tibia; 36, *rufipalpis* ♀, thorax, lateral; 37, *asteris* ♀, thorax, lateral; 38, *nigra* ♀, thorax, lateral; 39, *pedias* ♀, gaster, dorsal; 40, *zaykovi* ♀, gaster, dorsal; 41, *glabricula* ♀, thorax, lateral; 42, *fulmeki* ♀, thorax, lateral.

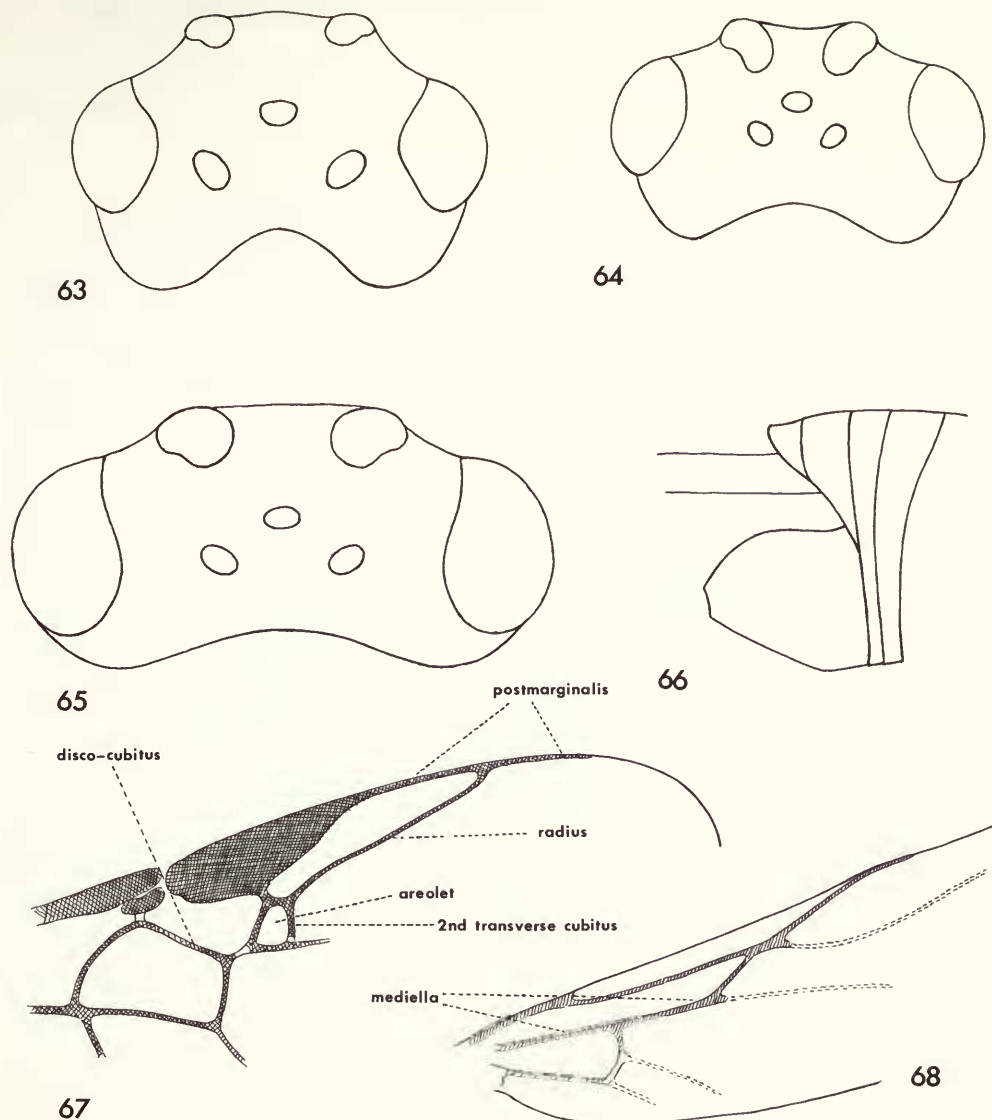


Figs 43–55 43–53, *Agathis* species. (43) *semiaciculata* ♀, hind claw; (44) *griseifrons* ♀, hind claw; (45) *nigra* ♀, hind claw; (46) *glabricula* ♀, hind claw; (47) *zaykovi* ♀, hind claw; (48) *tibialis* ♀, hind claw; (49) *anglica* ♀, part of forewing; (50) *varipes* ♀, part of forewing; (51) *fulmeki* ♀, mouthparts; (52) *brevisetia* ♀, ovipositor sheath, dorsal; (53) *tibialis* ♀, hind tibial spurs and basal segment of hind tarsus. 54, 55. *Microdus* species. (54) *nugax* ♀, part of forewing; (55) *cingulipes* ♀, part of forewing.



**Figs 56–62** 56–59 *Microdus* species. (56) *eriphyle* ♀, hind claw; (57) *lugubrador* ♀, part of forewing; (58) *tumidulus* ♀, part of forewing; (59) *lugubrador* ♀, base of antenna. 60, *Baeognatha armeniaca* ♀, part of forewing. 61, 62, *Microdus* species. (61) *conspicuus* ♀, part of forewing; (62) *eriphyle* ♀, gaster, dorsal.





**Figs 63–68** 63–66, *Microdus* species. (63) *lugubrator* ♀, head, dorsal; (64) *eriphyle* ♀, head, dorsal; (65) *fortipes* ♀, head, dorsal; (66) *linguarius* ♀, apex of gaster, lateral. 67, 68, *Earinus gloriatorius* ♀. (67) part of forewing; (68) part of hind wing.

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